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Monitoring Times®

Big Shortwave Issue:

Radio Romania
Remembers

A visit to the
Voice of Russia

From Ireland to California:
Marconi stations
leave their mark



Magne Reviews the
JRC NRD-345

Deutsche Welle's Digital Debut

*****3-DIGIT 535



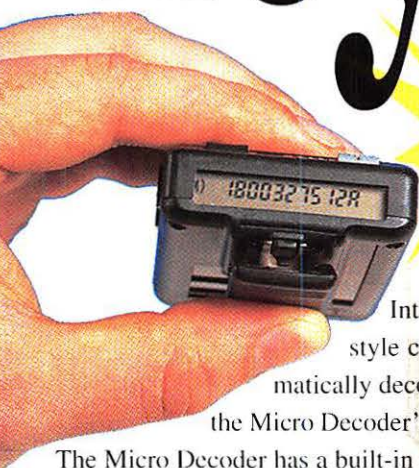
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Cover Story

Nauen Digital Shortwave Station

By Harald Kuhl

Deutsche Welle made a major investment in the future of shortwave broadcasting this past spring. Four new transmitters came on line from Nauen near the old Radio Berlin International compound. At the station's inauguration April 25th, a demonstration proved the quality of digital versus analog, and signalled DW's readiness to begin digital AM broadcasts.

In an interview with the author, Director Dieter Weirich predicts, "If digital shortwave meets the expectations placed in it and establishes itself on the market, shortwave will probably attain a new quality of acceptance." Story and pictures on page 8.

C O N T E N T S

Radio Romania, Looking Up 14

By Frederica Dochinoiu. Now that things are looking up, the head of Radio Romania's English Department stops to take a look back.

Visiting the Voice of Russia 16

By Bruce Atchison. On a rare visit to Moscow, this Canadian listener arranged to meet the staff of *You Write to Moscow*; before he knew it, he was a part of the show!

Marconi's California Stations 18

By Leon Fletcher. In their day, Marconi's transmitting station in Bolinas, California, and the receiving station in Marshall, were among the most powerful radio stations in the world. Yet today, there is very little known about them. Station KPH ceased operation July 1, 1997, though the call sign lives on.



Morse Code: Down but not Out 22

By Arthur Lee. Communication station KFS in Half Moon Bay, California, is the headquarters of Global Radio Network (which now owns KPH). Globe's CW network still sends CW, and still monitors the old emergency 500 kHz frequency, even though the Coast Guard no longer does.

Marconi in Ireland 24



By Finbarr O'Driscoll. Ireland pulled off a coup when it successfully lobbied for a major Marconi exhibit during the centennial celebration. But then, Marconi had many ties with Ireland, including the first transatlantic voice transmission from a place with the evocative name of Ballybunion.

Reviews:

The affordable NRD-345 puts Japan Radio back into the horse race, says Larry Magne (p.92), especially with the quality construction and superior ergonomics expected of JRC gear. In spite of shortcomings, it's the first model to provide serious competition to Drake's SW8.

Bob Parnass reviews the JD-100—a handheld scanner for aviation fans *only!* (p.94). A quick look at the BC895XLT TrunkTracker (p.88) finds it lives up to what we expected of the triple-conversion desktop scanner.





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amfmtdx AM/FM/TV DX mailing list
atlantic Aircraft monitoring over Atlantic
code30users Hoka Code 30 demodulator users
code3list Hoka Code 3 and Code 3 Gold decoder users
fedcom Federal communications
hearsat-I HearSat-I Mailing List
milcom Military HF/VHF/UHF communications monitoring
scan-dc Scanner radio topics in Washington, DC - Baltimore
trunkcom For discussion about the new TrunkTracker scanners
wun Worldwide UTE News Club List (Nonbroadcast SW Radio)

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Make Way for More

One of the fastest-growing uses of radio (besides cellular phones) is in two-way communications which require no license. We have invited Jock Elliott to join the writing staff, beginning next month, to address these technologies in a page opposite the ham bands column.

"Making way" for the new coverage are the events calendar and club circuit, both of which have grown too large for adequate coverage in the magazine. We will continue to mention those special event announcements sent directly to *Monitoring Times* in the Bulletin Board on page 7: For all other hamfests, we refer you to the ARRL web site. Clubs (North American and a few international clubs), as well as amateur radio nets of interest to monitors, can be found on the *MT* website. For those not on the Web, a print-out of the North American clubs is available anytime for a business-sized, self-addressed, stamped envelope to Club Circuit.

Additions and Corrections

- Just after we published Ed Muro's article on emergency medical services in October, I received notice from Ed that the New York system was in the process of moving some of their frequencies, though they were still simulcasting on the old channels. Asterisks mark the new assignments.

New York City Fire Department- Bureau of EMS

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Brooklyn North	478.2625
Brooklyn Central	477.8625
Brooklyn South & Staten Is.	484.2375*
Bronx North	478.2125
Bronx South	477.8375
Manhattan North	483.2375*
Manhattan Central	483.1125*
Manhattan South	483.3625*
Queens	477.9125*

- The schematic for the Ocean Hopper (August '97 feature) had some errors in the wiring. Author Al Cikas has mailed out the correction to those who have contacted him directly. He has also supplied a corrected drawing to us here at *MT*. If you would like a copy, please send an SASE to MT Editor/Ocean Hopper schematic.

Tower Spotting

"I enjoyed your 'Confessions of a Chronic Cell Site Spotter' article in the Sept. issue. I always thought I was the only one who would actually be interested in such things! Al-

though I haven't gone all the way to making written logs, for some time I've been making mental notes, scrutinizing the towers for the different types and configurations of antennas, and noting their locations as they've spread over the metro Detroit area. The best response to the author's final question about 'clinical treatment' may just be that he's not alone...there are others out here hooked on cell sites!

P.S. Thanks for the great magazine every month!

Stephen Kaatz, *Suburban Detroit*

"I absolutely loved the article 'Confessions of a Chronic Cell Site Spotter' appearing in the September issue. After reading the article I felt that an excellent follow-up article would be a technical explanation of the exact antenna models ('bevel-decked, dual polarized array with orthogonal 45-degree slant radiators mounted in a cylindrical radome' was one example).

"I would also like to thank you for the general excellence in all the articles appearing in *MT* and can't imagine not subscribing! A month without *MT* is a month without oxygen. Please continue the fine articles!"

Roland Stiner, *NK2U, DU1A*

The example at the top of p. 19 (Sept. issue) and the smoke-stack-like illustration on p. 18 are both cylindrical radomes, which probably cover an antenna which looks a little like the middle illustration on p. 19.

Our fine articles are entirely due to the high level of expertise and observation to be found among *MT* readers who decide to put pen to paper and share it with others. As you can see, no topic is too "far out" to consider!

— rb

Having a Good Time

Beginner's columnist Skip Arey shared some fan mail with us from Michael Addiego, who wrote:

"I have said it once and I'll say it again. Listening to you is listening to an Elmer. If this hobby has a future (and I know it does), it is because of people like you who make it simple, satisfying, and fun and obtainable to the simple man. Just one look at the latest copy of *QST* magazine would make one think that you do need to break the bank. As I said before, it ain't about money. It's about 'stringing that wire up in fancy ways' and having a good time."

Las Vegas Adventure

John Poore took his July '97 *Monitoring Times* (with Larry Van Horn's article on Area

51), three scanners, video and still cameras, and spent a week in the Las Vegas/Area 51/Nellis AFB area. He writes, "I had a blast."

"The Janet flights are still flying and the Cammo Dudes in the white jeeps are still there watching. Made it to the Groom Lake Road entrance where the signs are and within three minutes they were up on the ridges watching us.

"We also went to Rachel, Tonopah, the Nevada Test Site, and Art Bell's Pharump Nevada. Lots to see and the scanners never stopped.

"We arrived right before Labor Day and the parking lot at the Janet Air Terminal was empty, looked almost closed, but come the Tuesday after the holiday it was full. We watched three flights leave within an hour of each other that Tuesday. All were solid white 737s with red stripes and no markings whatsoever, no (N) numbers, no names, no nothing that I could see from down the street.

"That was a great article and lots of the information was dead on. Didn't see any UFOs but did see a beautiful flight of three B-2 bombers being escorted by a flight of four F-15s and one KC-10 Extender flying east to west across the range."

Broadcasting over the Internet

"When are broadcasters and others who relay the transmissions of broadcasters over the internet (such as the World Radio Network [WRN-1] and AudioNet) going to realize that they are providing a service to a worldwide audience? Yet, most continue to publish their program guides over the internet using local times and local days. North American broadcasters are especially guilty of listing their programs in Eastern Time.

"Imagine a listener in India adding 11 hours and 30 minutes to the CBC program

Continued on page 93

You are Not Alone!

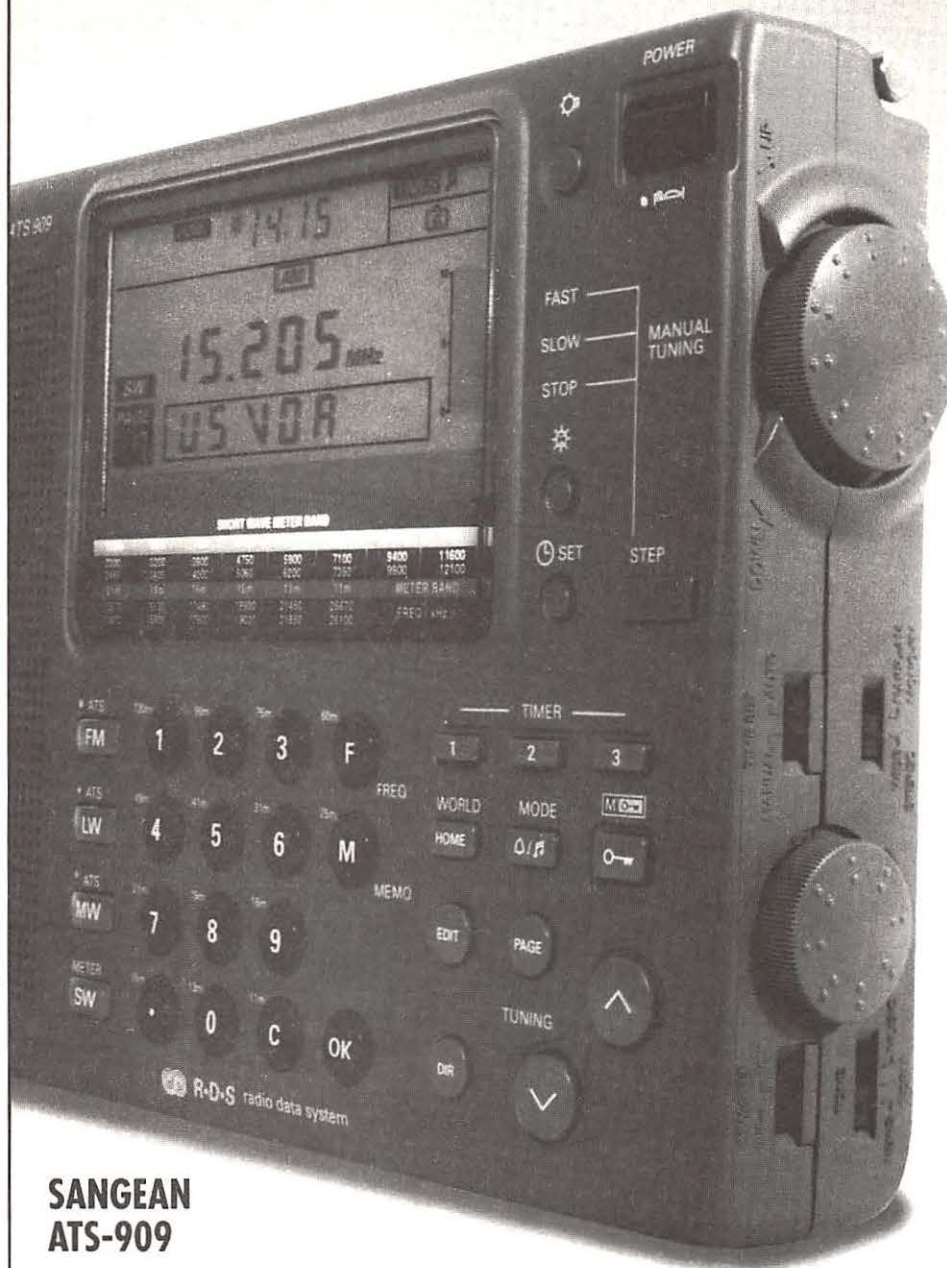
To find other radio hobbyists, consult <http://www.grove.net/mtclubs.html> for a listing of radio clubs and nets worldwide, or send an SASE for free list (NA only) to Club Circuit, PO Box 98, Brasstown, NC 28902.

No local club? Join a managed email list (see p.2) for your area of interest.

For hamfests in your area, visit <http://www.arrl.org/hamfests.html> or call the ARRL at 860-594-0200.

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Hobby Loses Two Heroes

Doug DeMaw, W1FB: 1926 - 1997

Doug DeMaw, author of "DeMaw's Workbench," world-renowned amateur radio designer, writer, and personality, died at his home September 28, 1997, of acute leukemia.

Doug was first licensed in 1950 when he was working in the research and development department of the University of Michigan's Willow Run Research Center. He worked as an electronics engineer for WWTW and for Ryan Aeronautical Laboratories. In 1960, he set up his own company, "Avtronics," and began *The VHFer Magazine*.

Doug joined the ARRL headquarters staff in 1965, and continued with the ARRL in various technical and editorial positions for 18 years. His wife Jean, W1CKK, worked in the ARRL awards department.

In 1983, Doug retired to the north woods of Michigan, where he formed "Oak Hills Research" in partnership with his son, Dave, N8HLE/1. He continued to be prolific in producing books for the ARRL. He was, in his own words, "recruited by Ike Kerschner" to write for *Monitoring Times* in 1988, and his straightforward, understandable writing style has encouraged and inspired potential experimenters ever since.

Doug also served his local community as county commissioner from 1984 to the present time. Our condolences go out to Doug's family; his loss will be felt by radio amateurs and monitors everywhere, not just because he was such a good teacher, but because he was such a fine human being.



Photo by Ike Kerschner



Arthur Cushen 1920 - 1997

Arthur Cushen—a radio DXer familiar to shortwave listeners over the past fifty years—died on September 20 of bone cancer, in Invercargill, New Zealand.

Cushen was known through his lifetime participation in the New Zealand Radio DX League and through his writing for many newsletters and magazines, including *Monitoring Times*. His DX reports, which he ad libbed from his notes in braille, were aired by

Radio New Zealand International and Radio Nederland. He also served as a radio monitor for the BBC, VOA, and RCI, logging and reporting on the effectiveness of their frequencies to the South Pacific.

"It was back in 1932 that Arthur Cushen, at that time suffering from very poor sight, heard a broadcast that gave him a new outlook on life," begins a *Monitoring Times* profile of the now famous DXer



(see www.grove.net/hmpgmt.html for the entire Dec. '93 article). Forty years later Cushen was personally presented with the MBE award by Her Majesty the Queen in recognition of his services to radio listening and the blind community.

Arthur was deeply indebted to his wife, Ralda, and a loyal staff, who helped him remain independent and enormously productive throughout his life. With their help, he single-handedly recorded and preserved the history of radio broadcasting in the Pacific region up to the present time. Arthur, your legion of listeners are deeply grateful for your life and your love of radio.

PSYOPS I

When is a broadcast 1) information in the public interest, 2) propaganda intended to influence for political purpose, or 3) jamming of the opposition's transmissions? Sometimes it can be all three.

The U.S. has used EC-130 aircraft specially equipped for radio and television broadcasting in crisis situations to counter propaganda and misinformation, or in friendlier situations to inform and educate. However, during critical municipal elections in Bosnia, the U.S. military announced its intention to use the transmissions for jamming, targeting broadcasts from Serb radio and television which were not abiding by the Dayton peace accords.

The International Telecommunications Union (ITU) Constitution mandates that "all stations, whatever their purpose, must be established and operated in such a manner as not to cause harmful interference to the radio services or communications of their members..."

PSYOPS II

Who controls access to information has always been a key weapon in the battle for a people's loyalty. Generally speaking, the more the access, the more free the people.

"We're truth," says Capt. Paul Hettich, commander of the 17th Psychological Operations Battalion. The PSYOPS battalion in Joliet, Illinois, is field-testing a mobile, all-spectrum station called the Special Operations Media Systems-B (SOMS-B). The unit can be transported in two C-130 cargo planes and be set up to operate in about three hours.

Capt. Hettich adds, "We're honest. Because if the enemy finds out what we're saying is fake, they won't listen anymore."

FCC Authorizes "Stealth" Mode

The FCC has granted a five-year waiver to a unique hybrid two-way data system called Flash Comm. Potential uses for the system are for remote vehicle tracking, automatic status reports, and other monitoring of mobile or fixed locations. Prime targets to use the system are the long haul trucking industry, transportation services, and public safety agencies.

The outgoing, wide-area message would be transmitted using the digital subcarrier of FM stations which have Radio Data Service (RDS) capability. The response—and this is the interesting part—would be returned in the HF band, using a narrow phase modulated

emission type originally developed for military applications. The main objective is economy.

Aeronautical, maritime, military, and amateur radio HF users protested that there was a good potential for harmful interference to their communications, since the mode is not as undetectable as spread spectrum technology. To meet these concerns, a number of restricting conditions have been agreed upon to establish limits on duration, power, directivity of transmissions, and frequencies—narrowed to about a thousand, sparsely-used frequencies between 3.170 and 25.037 MHz.

Flash Comm agreed to log technical data on every transaction, and the FCC expects the information to be useful in future decisions regarding use of the HF spectrum.

Call 911, Where are You?

A second ago you swerved to save the life of a 'possum and suddenly you find yourself at the bottom of an embankment. Your outstretched arm can barely reach your cellphone to dial 911, and it connects you to a dispatch operator in the next state. You don't know where you are: somewhere in Arkansas. All she gets on the computer screen is information about your cellular service provider.

The FCC has given the cellular industry until 2001 to correctly locate an emergency call from a wireless phone. New Jersey's Office of Emergency Telecommunications Services put one proposed system to the test using 50 miles of the New Jersey Turnpike. The location technology used to calculate the position of the caller was time difference of arrival (TDOA). The system showed promise and weeded out duplicate reports. It requires no modification of existing phones, but does require added equipment at each cellular site.

U.S. Wireless conducted successful testing of its RadioCamera location technology in northern California. This system uses a personal-computer-sized device that attaches to a few of the carrier's base stations. It does not require modification of the carrier's equipment or the handset, and is said to work well

in urban areas.

Until the new systems are finally in place, however, Dan Peterson, a communications center director, cautions callers to "be ready to provide a good description of their location by giving business names or street intersections, the nature of the emergency, and their cellular number in case of a disconnect."

A telecommunications study by Strategis Group found that 54 percent of cellular users wanted and were willing to pay for location technology built into their phone. Wonder if that goes for privacy, too?

Take the Channels and Run

TV broadcasters have nine years to convert their broadcasts to high definition digital television on channels given them for that purpose. At that time they are to vacate their analog channels. The give-back frequencies will be auctioned, except for those now occupied by TV channels 63, 64, 68, and 69 (746 to 806 MHz). Those have been set aside for use by public safety agency communications.

However, some broadcasters are now leaning toward the option of airing a digital picture of lesser quality in order to carry additional channels, internet connection, or data services. And some may not give up their analog station at all.

A negotiated agreement with Congress allows a station to keep its analog station if very few area households possess a digital set or converter, or if there is no major TV network broadcasting a digital signal, or if converter boxes are not generally available.

At this point, according to David Smith, president of Sinclair Broadcast Group, "We've yet to conclude where anybody makes any more money on a day-to-day basis as an HDTV broadcaster."

BULLETIN BOARD

Nov 2: Radio Romania Listeners Day

Radio Romania Listeners' Day is celebrated the first Sunday of each November to commemorate the first official broadcast made by the station, November 1, 1928. This year, the noon broadcast to Europe at 1300 UTC will include live phone-ins.

Nov 8-10: Special Event Station

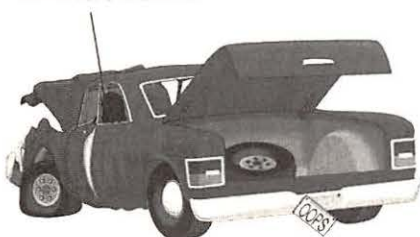
"Remembering the Edmund Fitzgerald" shipwreck 22 years ago, Stu Rockafellow ARS will operate from the Great Lakes Shipwreck Museum at the former USCG Station, Whitefish Point, Michigan. (The museum is closed to the public after Oct. 15.) Operation will be from 8a.m. Nov 8 to 5p.m. Nov 10, on SSB target frequencies 7.250, 14.250, 21.350, 28.350 MHz.

AMSAT Net on RealAudio

You can now hear the Houston amateur satellite net live as it happens anywhere in the world with RealAudio software. You can participate in the net by calling in live or by email. For more information contact Bruce Paige by email to: kk5do@amsat.org.

We welcome news clippings from your world of radio: send to Rachel Baughn, editor, at the *MT* headquarters or via rachel@grove.net. Thanks to this month's contributors: Anonymous, Albany, NY; Harry Baughn, Brasstown, NC; Temp Berdan via email; Norman Castro, Bellevue, NE; Bill Craig, Burbank, CA; Marc Crumpler, Livermore, CA; Jim Frimmel via email; J.D. Gammon, Cary, NC; Alan Henney via email; Mary Anne Kehoe, Atlanta, GA; Kevin Klein, Kimberly, WI; Tim Kridel via email; Clay Mayrose, WA6LBU, via email; H.W. Morgan, Bastrop, LA; Ira Paul, Royal Oak, MI; Richard Sklar, Seattle, WA; Doug Smith via email; and Larry Van Horn. We also consulted the following publications: *Dispatch Monthly*, *W5YI Report*.

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Rave Review
Pop Comm
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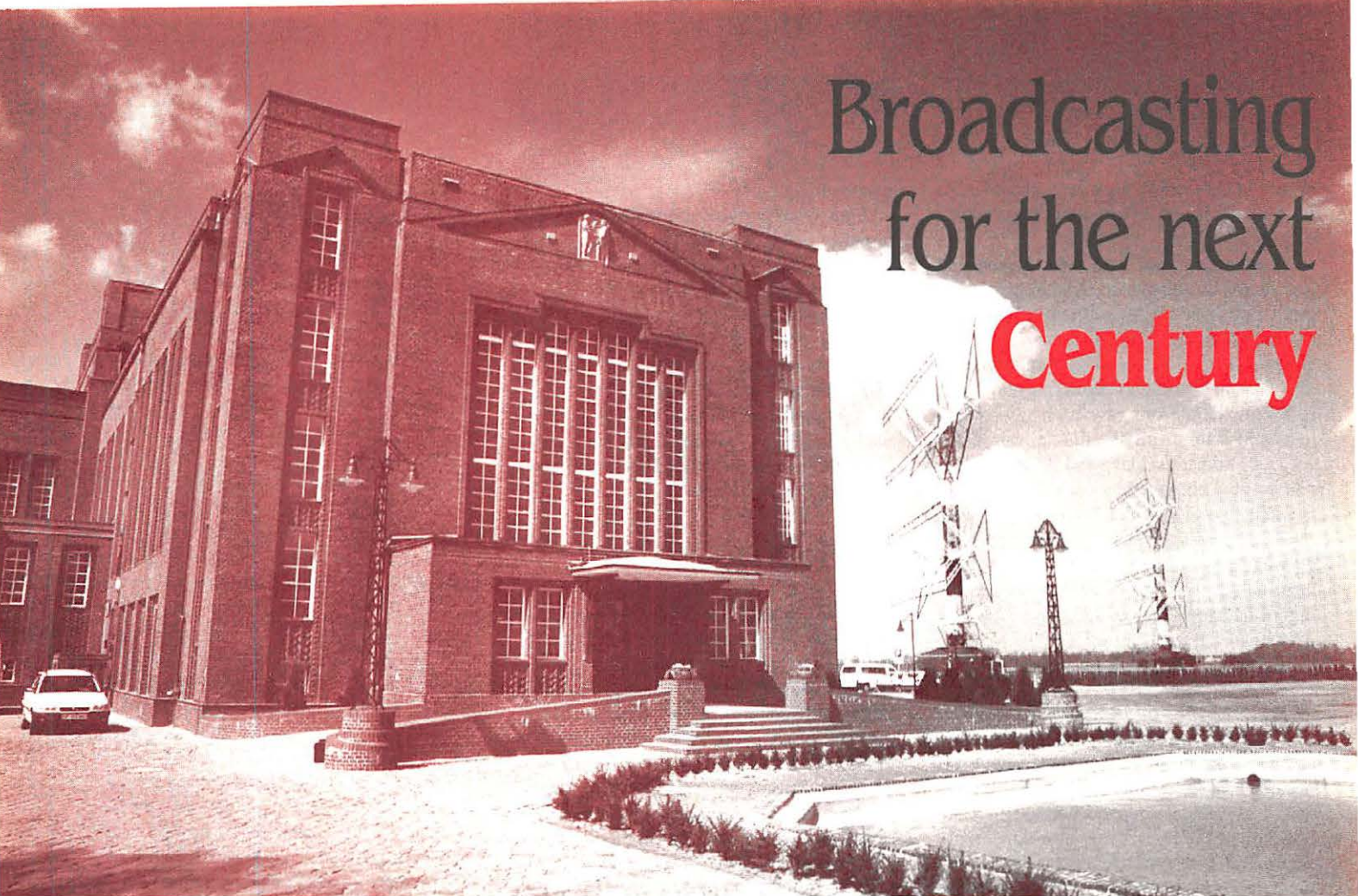
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Broadcasting for the next **Century**

The historic Muthesius building at Nauen: Here in the early stages of this century Telefunken started to build a global communications network, first using longwave and later (building on the good success of U.S. hams) also shortwave.

During the time of the German Democratic Republic, the Nauen time signal was broadcast from transmitters located here, as well as ADN news bulletins and messages from the foreign ministry. Some of those elusive numbers transmissions may even have come from here. The facilities of former Radio Berlin International are found on another compound nearby.

Today, only the offices and the control room for the remaining shortwave broadcasting units are located here.

Deutsche Welle's

Nauen Digital Shortwave Station

Story and photos by Harald Kuhl

One of the most modern shortwave stations started operating in Nauen (located west of Berlin, Germany) on April 25, 1997 — more than doubling the transmitting power of Deutsche Welle (DW) in Germany. With investments totalling some DM 80 million, the station was expanded by four new 500 kW shortwave transmitters.

Now with one 100 kilowatt transmitter and four powerful 500 kilowatt transmitters plus turntable antennae, Nauen is one of the most modern shortwave transmission centers in Europe today. This is the site from which Deutsche Welle broadcasts its radio programs in German and many foreign languages. The entire broadcasting volume encompasses some 90 hours each day. DW-radio can be heard almost anywhere on earth with a small world receiver.

Clearly, the upgraded Deutsche Telekom plant enables DW to broadcast its radio programs via shortwave to critical areas of the world with better quality. At the same time, Nauen meets the requirements for entering the field of digital shortwave technology.

Altogether DW will air some 36 hours of radio programs on a daily basis via Nauen: 24 hours in German, 5 hours in English, 90 minutes each in Arabic and Bulgarian, 60 minutes in French for Africa, Spanish for South and Central America, as well as Romanian, and 30 minutes each in Brazilian, Indonesian, and Hungarian.

"With the help of an ultra-modern antenna array, the maximum field strength can be concentrated exactly on the target area. This is particularly important for DW's programs for

crisis regions," Dr. Hans-Dieter Godtmann, technical director of DW, said. He also stressed that the transmitting station in Nauen shows that DW will continue to use shortwave in the future, too.

"Nauen offers the prerequisites for the planned digitization of shortwave. Our foreign language programs profit from that. This is a quantum leap for DW."

In the meantime, the advantages of digital shortwave are already being tested in various broadcasts in Nauen. The contract that DW concluded with Deutsche Telekom on the use of the plant extends until the year 2016.

■ Some Background on DW

The programs of the German international broadcasting service offer information and much else besides, all over the globe. DW is required by law to convey a well-rounded picture of political, cultural, and economic life in Germany, an objective overview of world events, and the reactions both of the public and the leading figures in German government and society to those events.

DW is a public broadcaster independent from the German government. For people interested in Germany anywhere in the world, Deutsche Welle is the service provider in all matters related to information. One important target group is opinion leaders with an interest in Germany. Traditionally this has also included German nationals living temporarily or permanently abroad. Deutsche Welle views its mission as a constructive contribution to improved understanding between the peoples and cultures of the world.

Since 1992 — when the former RIAS television was handed over to DW — the second mainstay of the German international broadcasting service has been television coverage of current events. DW-TV's news program is broadcast non-stop via satellite, with thirteen hours in German, nine in English, and two in Spanish. At the Cologne headquarters, Berlin office and studios in Bonn, Washington, Moscow, and Brussels, there are some 1,800 employees from 75 countries carrying out Deutsche Welle's mission. Two-thirds of the journalists in this miniature international community are foreign nationals.

■ Using Traditional and New Technology

Founded in 1953, Deutsche Welle stands alongside the BBC, Voice of America, Voice of Russia, and China Radio International as one of the world's five largest external broadcasting services. To remain strong and com-



Instead of using a collection of wire dipoles found in traditional curtain antennae, the dipoles are made of steel and form an integral part of the whole antenna structure, making maintenance much easier (and cheaper).

petitive in the face of this competition on the international communication markets, even into the twenty-first century. DW's director general Dieter Weirich is building on a comprehensive modernization program and the use of state-of-the-art information and communication technologies. Viewed in this light, the Nauen Transmission Center is a key element in DW's shortwave strategy.

Granted, shortwave has declined in importance over the past decade. The worldwide process of liberalization among states and societies is as much responsible for this as are innovations in media technology and new

methods of transmission. In large parts of the world listeners have grown to expect higher quality of reception due to satellite delivery of radio programs and the often easy access to local VHF stations. Deutsche Welle likewise makes use of a network of powerful satellites circling the globe in order to distribute its TV and radio broadcasts to all corners of the earth.

But shortwave remains, as ever, the only medium for reaching listeners directly by portable receiver. Especially in developing countries and regions where the freedom of information is limited or nonexistent, shortwave radio offers an opportunity to receive objective information without censorship. For this reason, analog shortwave will remain indispensable in the foreseeable future.

To maintain its international competitiveness in this sector, Deutsche Welle has pinned its hopes since 1989 on the expansion, modernization, and streamlining of its existing transmis-

sion systems and increased use of rented short- and medium-wave transmitters. This new quality is apparent in its active frequency management and its cooperation with the thousands of rebroadcasters who adopt its program, either in whole or in part.

■ Terrestrial Transmitter Network

With its resources in terrestrial broadcasting sites, transmitters, and transmission power output, Deutsche Welle has increased the presence, both in quantity and quality, of its radio programs throughout the world in order to

VOA Tests Digital Transmissions

In the United States, engineers for the International Broadcasting Bureau and the Jet Propulsion Laboratory have been working on adapting for use on HF a system they designed for DBS-Radio (digital audio direct to listeners via satellite). Field tests were run in May, and more were planned for the late summer.

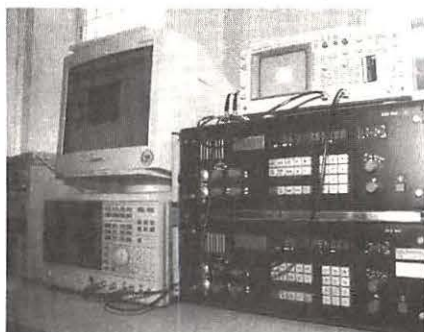
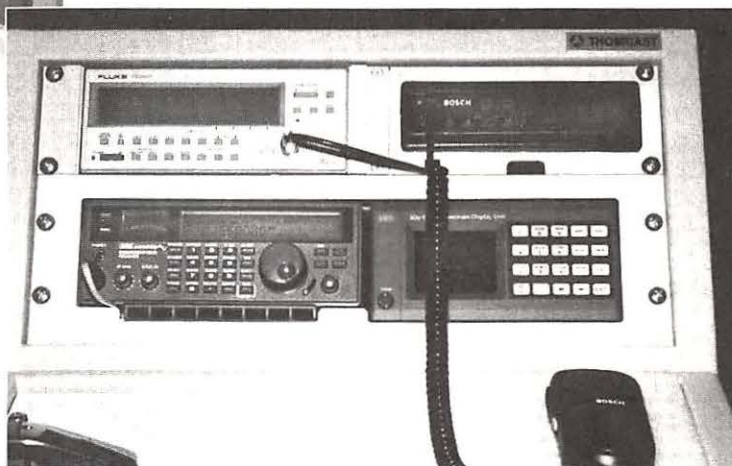
The results were very satisfactory. In each test sequence, three minutes of analog AM shortwave signals were transmitted at three different times in the digital transmission. According to the IBB report, "In sharp contrast with the digital audio transmissions, these analog signals had considerable noise and fading."

The engineers concluded that digital transmissions hold great promise for enabling higher-quality shortwave broadcasts over long distances.



Everything under control (left): From here, up to six shortwave broadcasting units can be remotely controlled. In the background on the left, the satellite receivers are located for getting the program-feed from DW's HQ at Cologne.

Right: Does this look familiar? In the control room at Nauen, an AOR AR5000 communications receiver and Spectrum Display Unit are used for monitoring the audio of signals leaving the shortwave antennae. The upper row shows an extremely precise frequency counter (left) and a professional VHF transceiver (right) used for internal communications.

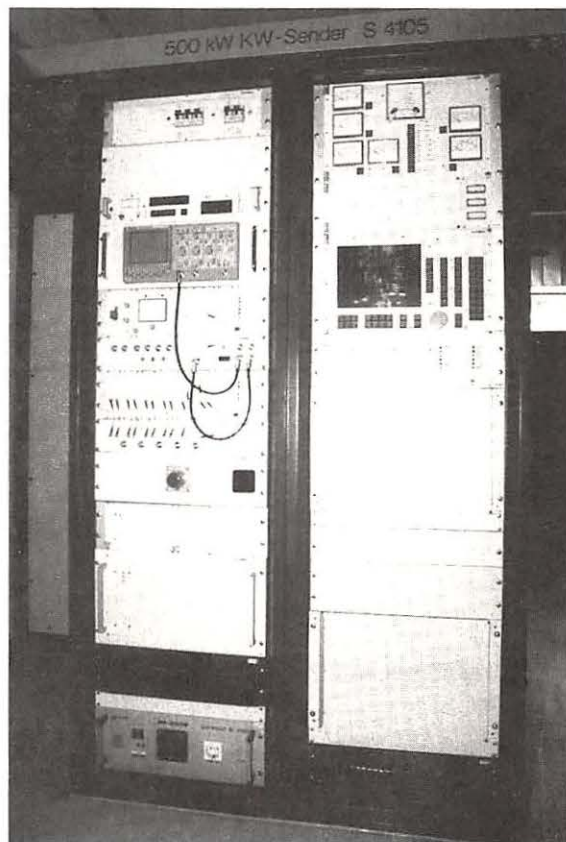


Left: While there are already systems available for broadcasting digital shortwave, you still have to improvise quite a bit when trying to demodulate the signal back into audio: During the digital test in Nauen, two professional EKD 500 receivers — top of the line communications receivers built during the late German Democratic Republic — were used for receiving the signal. It was then fed into computers for the demodulation process before the final result could be broadcast by the speakers.

Right: How would you test a 500 kW transmitting unit? Just reduce the power a little bit and put a carrier on the air like the hams do? No way! Here's a two meters high dummy load where you can waste up to 1,000 kW!



Far Right: During inauguration of the new transmission facilities at Nauen, Telefunken und Deutsche Telekom successfully combined a jointly designed digital modulation and receiving system with a Telefunken Model S4105 500 kW shortwave transmitter to deliver the world's first over-the-air digital/analog multicast shortwave transmission. Using this system, it becomes possible to broadcast on the same frequency and at the same time both in analog and digital modulation without mutual interference. During a transition period, traditional shortwave radios as well as new digital shortwave sets would receive the same program. However, this is just one of three possible future digital shortwave broadcasting systems currently under development.



fulfill its legislated mandate. Today, in addition to the capacity of the Nauen Transmission Center, it also makes use of thirteen 500 kilowatt shortwave transmitters in Wertachtal, i.e. eighteen transmitters altogether with a total power output of 8,600 kilowatts.

Equally essential to DW-radio's worldwide direct coverage in German and foreign languages are its relay stations. Deutsche Welle maintains such stations in Rwanda (four 250 kilowatt transmitters in Kigali), Sri Lanka (three 250 kilowatt transmitters in Tricomalee), Portugal (three 250 kilowatt transmitters in Sines) and in the Caribbean island of Antigua (two 250 kilowatt transmitters). It transmits medium-wave broadcasts from stations in Sri Lanka, Russia, Moldavia and Montserrat (Caribbean), and uses a VHF transmitter in Sofia (Bulgaria). It has also entered agreements on the exchange of broadcasts with Radio Canada International, Radio Nederland Wereldomroep, and Radio Vlaanderen International.

Since 1989 the total power output of DW's terrestrial transmitters has increased some 25 per cent to 12,300 kilowatts. Furthermore, by renting twenty transmitters with power ratings from 100 to 1,000 kilowatts, DW-radio has improved the terrestrial distribution of its programs abroad by 114 frequency hours each day. This amounts to a 6,120 kilowatt rise in transmission power output.

In those countries and regions with deregulated, liberalized markets and established systems of modern communication technology, Deutsche Welle is placing its hopes on such vehicles as rebroadcasters and analog/digital satellite systems for direct reception. By participating in international commissions it actively supports the development of such cutting-edge technologies as digital shortwave or satellite DAB. Also new broadcasting technologies like Real-Audio and Audio-on-Demand via the Internet are not overlooked.



*King of
all Coax?*

Each of the four new transmitting units at Nauen contains a 500 kW transmitter in a heavily shielded building and a rotatable antenna on its roof. The short path between transmitter and antenna keeps loss on the feeder line low and efficiency high. Everything can be remote controlled from a console in the main control room.

Speaking of feeder lines ... the photo at left shows the coax cable leading from the transmitter to the antenna system located directly above. Low-loss? You bet!

Write to Save Shortwave Broadcasting!

If digital shortwave, with its outstanding quality of reception, can establish itself with listeners, terrestrial transmitters of international broadcasters in their own respective countries as well as relay stations abroad will once again gain in importance. Due to its considerably lower emission powers, a digital shortwave transmitter network would also lead to a sharp reduction in costs. In times of steadily decreasing budgets of international broadcasters around the globe, this new technology might contribute to the rescue of international shortwave broadcasting in the long term.

It is encouraging that, in spite of digital satellite TV broadcasting and the internet, leading international broadcasters are beginning to realize that they cannot just shut down their shortwave outlet without losing the majority of their listeners.

We, who are their listeners, should regularly tell our favorite stations that they still do have a large shortwave audience. Otherwise, as more international broadcasters get into heavy financial trouble — as have Radio Canada International, Channel Africa, and Radio Australia — the powers that hold the purse strings may decide these stations won't be needed in the 21st century.

Shortwave for the Future

An Interview with the Director

Deutsche Welle is currently undergoing a thorough process of modernization. The focus falls on the digitization of production in radio and the use of new transmission methods. Thus, DW-radio and DW-TV have been present in Africa and the entire Pacific Rim region since the spring of 1996 using the digital MPEG 2/DVB standard. At the same time DW has also been perfecting its shortwave infrastructure, for even today it reaches most of its program listeners via shortwave. Dieter Weirich, Deutsche Welle's director general since 1989, explains his strategy:

Weirich: The underlying conditions for global communication are changing at break-neck speed. The question is, what technical strategy will Deutsche Welle use to stand up to its competitors on the liberalized, deregulated information markets? Given the competition from other international broadcasters, Deutsche Welle will not be able to fulfill its mission unless it uses transmission media appropriate to each of its target areas and groups. Thanks to new products and procedures in audio and video consumer equipment, demands on quality of technology and variety of programming are constantly increasing.

As budgetary resources are declining, we are in no position to make use of all the promising new transmission methods and, at the same time, retain or even expand our older traditional methods without making sacrifices. Depending on the policies and technological factors governing the media markets, it is essential for us to take a sophisticated, many-sided approach. Our top priority is to convert to digital methods of production and transmission. But we also want to push the expansion of our program-related service spectrum, extra data, and online services.

Deutsche Welle is second only to CNN in having the world's densest satellite network in the field of broadcasting. Basically, we transmit on all satellite transponders or channels leased for the purpose of distributing DW-TV and the German or foreign-language programs of DW-radio. This causes greater acceptance of direct-to-home reception and simplifies our marketing activities among rebroadcasters.

MT: What advantages does Deutsche Welle foresee in the use of digital technologies?

Weirich: The future clearly belongs to digital technology. It is qualitatively better, and in the medium term, it will be less expensive on the consumer market than analog systems. The progress of technology has produced a considerable rationalization potential that we must rigorously seize upon. For example, we obtain

additional income by subletting television channels on transponders of digital satellites. The financial resources this saves us are largely rerouted into our programming.

In 1997 our program budget will amount to DM 123 million. Some DM 120 million — a good fifth of DW's entire budget — are earmarked for broadcasting radio and television programs via shortwave, medium wave, and satellites. One advantage of satellite technology that is especially important for external broadcasters is that it enables us to vastly expand our range beyond direct reception by

means of rebroadcasting, cable or hotel feedings. This will enable us to gain new groups of listeners and viewers.

MT: Hasn't conventional shortwave already had its day as a vehicle for broadcasts on DW-radio?

Weirich: Shortwave radio still retains its importance, especially in countries where freedom of information is limited or nonexistent, or where the technological infrastructure is underdeveloped. Moreover, shortwave broadcasting is at present the only way listeners can hear programs on small, inexpensive world band receivers. A poll conducted last year revealed that, depending on the target area involved, between 85 and 97 percent of the listeners of DW-radio's German-language programs receive the broadcasts via shortwave.

However, we will have to find ways of supplementing analog shortwave in the medium term, and ways of replacing it in the long run. Since 1994 we have been working with other foreign broadcasters in a consortium called "Digital Radio Worldwide" (DRW) with the goal of introducing digital AM radio broadcasting. Deutsche Welle is also a member of the EuroDAB Forum, which seeks to introduce Digital Audio Broadcasting (DAB).

Another project that points in the same direction is WorldSpace, which is scheduled to go into operation toward the end of 1998. Using satellite DAB, large areas of Africa, Asia and Latin America are to be

covered in such a way that reception with inexpensive portable equipment of high technical quality will be feasible.

MT: In other words, Deutsche Welle's and Deutsche Telekom's considerable investments in Nauen will eventually pay off?

Weirich: Absolutely. If digital shortwave meets the expectations placed in it and establishes itself on the market, shortwave will probably attain a new quality of acceptance. Our investments in Nauen will then not only be important for the next ten to fifteen years, they will be investments in the future, for we will already have the technical infrastructure we need to switch over to digital shortwave.



Germany's antenna technology of the past was impressive in its own right. Still the only one of its kind, the antenna built in 1964 for Radio Berlin

International consists of two antenna arrays with rigid dipole units that can be used alternately depending on the frequency employed and the area to be covered. It can be rotated up to 360 degrees horizontally and tilted up to 50 degrees vertically.

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*Pictured Right:
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By Frederica Dochinoiu

Radio Romania International can finally say that it is being modernized! We have gotten new computers and we have a brand new Studio 11 so it is now a pleasure to work and produce our programs for listeners worldwide. However, as we look to the future, we find many of our listeners want to know about the past history of our station.

The first Sunday in November is set aside as Listeners Day, with special programming and interviews with listeners. It is our way to commemorate the first official broadcast made by the station, November 1, 1928. The first news bulletins in foreign languages were broadcast in English and French in 1932.

RADIO ROMANIA,

LOOKING UP!



Roxana Anca (left), producer of Cultural Survey, and Lisaura Ungureanu, producer of Radio Pictures, in the new Studio 11 control room.

The first shortwave transmitter on 3250 kHz became operational on January 1st, 1940. In 1942, 30 broadcasts were transmitted weekly for Italy. One hour broadcasts were also transmitted on a monthly basis for Japan, Finland, Croatia, and Slovakia, and weekly programs for Germany. The 4 kW station transmitted 1667 hours of programs a year.

At the end of 1944, the shortwave station was broadcasting for abroad on 3240 kHz between 2015-2120 UTC. In 1945 foreign broadcasts were transmitted in English, Russian, French, Hungarian, and German. On December 21st, 1947, the "Free Romania" station was set up. Since German troops destroyed the Bucharest studios as they withdrew, broadcasting activities were made from completely unfit buildings and with poor technical means.

The decision was taken in 1949 to build a Radio House in the downtown area of Bucharest. Gradually, the programs beamed to the whole world increased in both duration and number of languages. There was another boost in the early 60s as the communist government was interested in making propaganda about the achievements of the working classes.

Practically the same 13 language departments were kept for nearly 30 years. During that time the programs had a political charac-

ter, especially in the first half of the transmissions; the second half of each program had a more relaxed atmosphere in which we were able to present Romania's culture, music, educational system, etc.

When the people decided to get rid of president Nicolae Ceausescu on December 22nd, 1989, Romania's shortwave broadcasts were the first to announce his toppling to the world. It was from the windows of the English

Department that several revolutionaries addressed their passionate words to the people in the street, and to the world.

Finally the much anticipated moment had come! We could now say the truth about Romania and the people—the terrible life we lived without heat and appropriate food, but, worst of all, without freedom of speech. We, the members of the English Department, were immediately interviewed by reporters from Reuters, BBC, the *Washington Post*, etc. and they could hardly believe what they heard about the conditions we had to put with in order not to be dismissed.

The present General Department for Foreign Countries emerged, and the station name was changed in March 1990 to Radio Romania International. It produced 29 hours of programs in 13 languages. Expansion of the programs has gradually grown from 34 hours a day in 1993 to 38 in 1995. Four new language departments were set up: Macedonian-Romania, Hungarian, Ukrainian, and Bulgarian were added to English, French, German, Russian, Italian, Spanish, Portuguese, Arabic, Persian, Serbian, Turkish, Greek, and Romanian — bringing the number of language departments to 17.

In 1990 RRI had 151 staff members; now we have 190, 90 percent of whom are editors.

Since 1995 RRI has started restructuring its programs as you may have noticed in our schedules.

RRI organizes yearly competitions for listeners—the prize is a trip to Romania. RRI has also started organizing radio conferences for all radio stations which have a Romanian language department. So far we have had five such conferences, always held in a different city.

It is RRI's policy to try to be as close as possible to its listeners, answering every letter not only in the broadcasts *Listeners Letterbox* and *DX Mailbag*, but also sending out personal letters. At present RRI verifies reception reports with 37 different QSLs. Our Listeners Club was started in 1968; it sends out three diplomas and two old timer labels for 12 monthly reports over a period of five years.

Radio Romania International had the honor of taking part in every Monitoring Times Convention from 1993 to 1996, which greatly contributed to its popularity. We also were pleased to have our Thursday *Skylark* folk music program mentioned as best musical program in Larry Magne's *Passport to World Band Radio*.

There is a lot more to be said about RRI, but we don't want to bore you. Better yet—listen to our programs and you will learn a lot about Romania and its people in this troubled transition period.



Youth Club in a Studio 11 recording session (left to right): Georgiana Zachia, our "mail girl"; Lisaura Ungureanu, Radio Pictures; Ioana Masariu, Sunday Studio and Pages of Literature; Dan Galamat, Listeners Letterbox for Asia, Africa, and Pacific; Frederica Dochinoiu, Listeners Letterbox.

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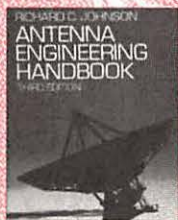
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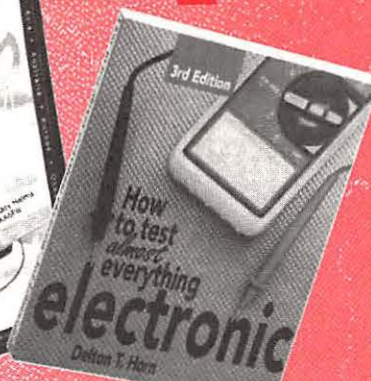
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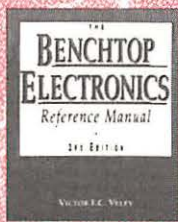
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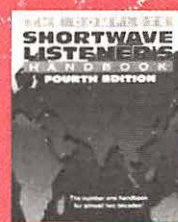
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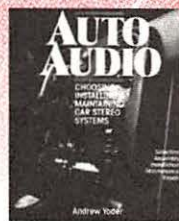
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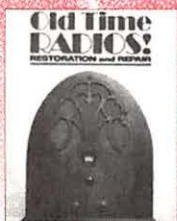
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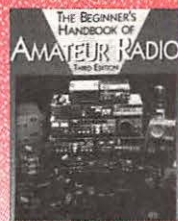
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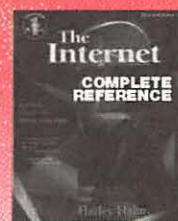
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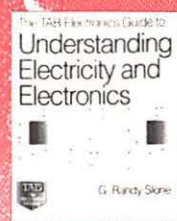
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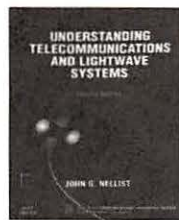
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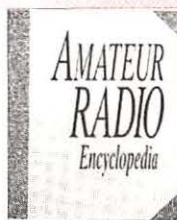
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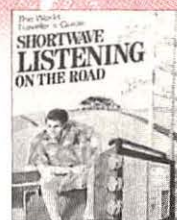
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MT1197

Visiting the

VOICE OF RUSSIA

The building where the VOR is located, as well as such Moscow stations as Radio Roks, Radio Maximum, Radio Nadezhda, Radio Unost, and Radio 101.

Bruce Atchison sitting behind the microphones at the VOR letters department.



By Bruce Atchison, VE6XTC

It isn't every day that a short wave listener gets to tour a foreign broadcasting station in a formerly communist country. It's even rarer to become a guest on one of their programs. I was privileged to have both of these experiences while visiting my pen friend in Moscow last January.

The city was having one of its typically cloudy winter days as my friend Sergey Tutov and I entered a salmon-colored building at 25 Pyatnitskaya street. We had arrived about 11:30 a.m. and were glad to escape from the blustery sub-zero weather. The guards at the foyer inspected my visa and Sergey's internal passport, which all Russian citizens must carry. Then they gave us passes, permitting us to be in the building. After some enquiries, and a lot of wandering through mostly unlit hallways, we found the Letters department of the Voice of Russia World Service (VOR).

We were welcomed by two staff members: Olga Troshina, who hosts the program *You Write To Moscow*, and a colleague she introduced as Helen. Sergey left me in the care of the VOR personnel. The women asked if I had any questions and they wanted to know my opinion of the station. We chatted about the differences between Moscow and "western" cities.

I asked about some medium wave (AM) stations which broadcast the same Morse code letters over and over. They didn't know the answer, but I learned later from Joe Adamov that they were for test purposes. We also discussed the difficulties people in North America have in hearing the VOR World Service. I told them that, for my location in Alberta, Canada, the frequencies 12050 and 13665 kilohertz were normally good ones, but the only frequency on which I heard their station in the dead of winter 1996 was 7125 kHz.

As we sat and talked about this and that, I could hardly believe it was really happening — to me of all people. Here I was, in a station whose government was formerly hostile to the free world, and I was being treated like an honored guest. Only 10 short years ago, I would have had an extremely difficult time with all the red tape necessary to let me visit. Every move I made would be carefully scheduled by a hoard of bureaucrats and Intourist, the department responsible for the care of foreign travelers. I wouldn't have considered visiting my pen friend since that would cause the KGB (the Soviet secret police) to think that he was a spy. I had heard about all the changes in Moscow and the former Soviet

government's propaganda voice but now I was seeing it with my own eyes.

Olga gave me a tour of the Letters department, beginning with the office in which she works. It was in a fairly small room (by Western standards), with only one window. The employees had decorated their room with a number of potted plants by the window and on top of various shelves. The colorful pictures and postcards on the walls and cabinets helped to give the room a cozy, informal feel. Thanks to budget constraints, VOR still has most of their lovely wooden furniture. Also, the staff still use electric typewriters and rotary dial phones to conduct their routine work.

Olga took me to one of VOR's studios. I noticed that they still use open reel editing decks and a mid-sized audio mixing board. We viewed a recording booth with its heavy sound-proofed door. It was a small room with wood panelling, a five-paned window to the editing room, and a table where the announcers read their scripts.

When Olga took me back to the office, Joe Adamov, the host of the long-running program *Moscow Mailbag*, was waiting to speak to me on the telephone. Since he usually arrives at the station around 5 p.m., he couldn't meet me in person. The line was full of static but we had a most enjoyable 20 minute chat. Joe asked me about my interests and if I was going to visit other Russian cities such as Saint Petersburg. He was surprised that I wasn't going there and also that I had planned to visit none of Moscow's music conservato-



Bruce Atchison (left) and Vladimir L. Zhamkin (right). Mr. Zhamkin is the editor in chief of the Russian State Broadcasting Company's VOR World service in English.

ries. Olga indicated it was time to go on to the next stop.

She led me into another of VOR's recording booths and told me to close the door. We sat down at the table and Olga spoke to a lady in the editing room via an intercom. Suddenly I realized that the tape was rolling and Olga was interviewing me for her show called *You Write To Moscow*. We went back over some of the same questions asked when we were first introduced, such as when I first listened to their station (formerly Radio Moscow), which programs I liked, and what I thought of them. The interview took only a few minutes to conduct.

When we returned to the office, I was introduced to Vladimir L. Zhamkin, the Editor in Chief of the Russian State Broadcasting company's VOR World Service English Department. We did some picture-taking, and Olga then presented me with a few souvenirs—a small 3" wooden Russian doll, an ornate brown clay mug, and a pin with the station logo on it. Olga also gave me a program schedule and pointed out when I could tune in the first weekly broadcast of her show. She said that I could hear our interview in two weeks time.

Sergey returned to take me back to his apartment and I shook hands with Olga and Helen. I would have liked to stay longer, but all of us had work to do or places to go, and I left with an invitation to visit again the next time I came to Moscow. Sergey and I left the station and handed back our passes to the guards at the main floor.

I was delightfully surprised at the way things turned out. Although I wasn't allowed to visit the other departments of the Voice of Russia World Service, I did meet the Editor in Chief, spoke to Joe Adamov by phone, and became a guest on the show *You Write To Moscow*. I also took many interesting photos to remind me of that remarkable visit.

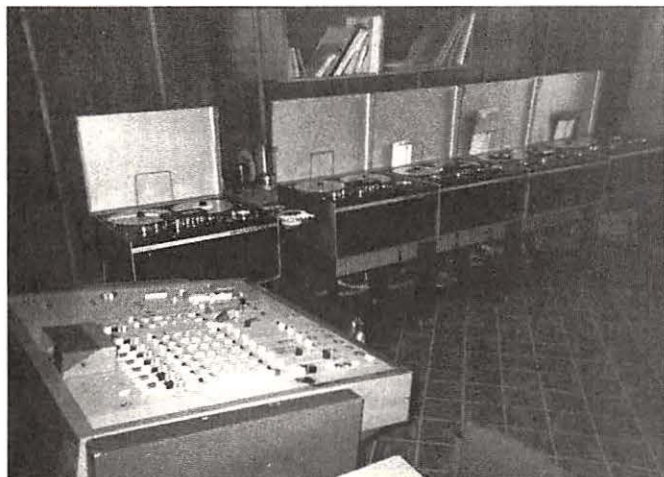
The VOR Letters department is part of the Russian State Broadcasting Company, funded mainly by the government. They receive letters from 160 countries around the world. These are then read, sorted, and, if time permits, incorporated into the letters program.

For further information you may write: The Voice Of Russia World Service, 25, ul. Pyatnitskaya, Moscow 113326, Russia. Their e-mail address is: letters@vor.ru and their World Wide Web home page is: <http://www.vor.ru>. On this site you'll find everything from frequency and programming schedules, to some transcripts of various news articles. It is also possible to hear the VOR in real audio via the World Radio Network at www.wrn.org

If you ever have the opportunity to visit Moscow and the VOR, please bear the following in mind. First write and ask the staff if it's alright to visit and tour their department. Touring the whole station is difficult since visitors must contact each department for permission.

Be sure to leave plenty of time for obtaining the visa. In my case, I applied in April, the visa was processed in August, and I received it in December. Russia issues visas for each entry of the country. This means that you must get a separate visa each time you enter Russia. The system is also very bureaucratic, so this may take a while.

Of course the usual luggage rules apply at the airport. My suitcases were X-rayed and passed through as in other international airports. Make sure you have your passport and visa with you at all times. You could be asked to present it to the police or other officials at a moment's notice during your visit. Of course all the common sense guidelines apply when travelling to Russia. Ask your travel agent if you have any further concerns.



This is the editing room where the "mail bag" programs are recorded.

MARCONI'S CALIFORNIA STATIONS



The hotel for staff working at the Marconi receiving station, Marshall, California, pictured in 1914, still stands today looking virtually the same. (California State Parks Photo.)

By Leon Fletcher

For Guglielmo Marconi, 1914 was a pivotal year. He became 40 years old. Britain's King George V honored him with the Knight Grand Cross of Royal Victorian Order. Italy's Premier Benito Mussolini appointed him Italian Senator for life.

But it was in the United States that Marconi achieved his major accomplishment that year. From California, the Marconi Wireless Telegraph Company of America delivered the first radio message ever sent from the United States to Japan, relayed through the company's station in Hawaii.

In their day, Marconi's transmitting station in Bolinas, California, and his receiving station, 20 miles north, in Marshall, were among the most powerful radio stations in the world. Yet today, there is very little known about them, even in their home towns some 50 miles north of San Francisco.

"Essentially all records of Marconi's California stations were disposed of in the 1970's by the company that then owned the Bolinas station," according to Dewey Livingston, historian for Point Reyes National Seashore, which is adjacent to the area between Marconi's two stations. Still, some facts—many of them intriguing—can be pinpointed.

■ Beginnings

In February 1913, the Marconi company

bought 1125.7 acres from Silvio and Clorinda Maggetti for its Marshall site. Construction started immediately; cost: \$226,000.

Marconi's stations were built by J.G. White Engineering Company of New York. Most of the large, heavy, cumbersome radio equipment was made in the East, sent by ships from New York to Panama. In tropical heat, the

gear was off-loaded from the ships, loaded aboard trains for the 35 mile trip to the Pacific Ocean, then moved aboard ships sailing to San Francisco. There, the equipment again had to be transferred, this time to small schooners which sailed to a specially built pier off Marshall. Other gear came to the site via a narrow-track railroad.



Two operators working at the Marconi radio equipment, circa 1923. (Photo from the Mr. & Mrs. Don Campaul Collection.)

Once again the equipment was unloaded, then placed on sleds drawn by as many as 20 horses. Finally, the gear had to be man-handled up the steep hill to the operating positions.

The receiving station in Marshall operated with the call KPH—which stood for the Palace Hotel, Marconi's San Francisco headquarters when construction began.

■ Technical Details

The stations operated at 300 kilowatts, 13,000 volts. Through underground cables, Pacific Gas and Electric Company supplied the current at 2,200 voltage, 60 cycles. That power was transformed to 440 volts to operate all the mechanical gear, including the motor that drove the alternator that changed the current to 210 cycles, 2,000 volts. Transformers then stepped it up to 13,000 volts for charging condensers and sparking across the discharger. It ran at 1,800 revolutions a minute, giving a spark frequency of 420. The current was carried from the condenser banks to the discharger not on the usual copper wires, but over a run of copper sheets more than a foot wide.

The transmitting antennas at Bolinas were supported by nine steel masts, each 300 feet tall, 500 feet apart. At the receiving station in Marshall there were seven towers, each 270 feet tall. One antenna was a mile long.

Early units included a receiver with carborundum detector and the Marconi 101 receiver with galena crystal.

■ Operations

To Marconi, the stations were a link in his plan to circle the world with high-powered wireless transmitters. In addition to communicating with Hawaii and Japan, the California stations provided message-handling service to ships at sea. The stations were manned around-the-clock.

After testing, service was officially launched in 1915 with messages exchanged between President Woodrow Wilson and the Emperor of Japan.

The receiving site at Marshall and the sending station at Bolinas coordinated operations via wires hung from poles. Technicians on horseback rode from one station to the other every day, making sure the wires were not damaged.

A tremendous bolt of lightning struck the Marshall station late in 1916. The on-duty operator, Richard Johnstone, was blinded temporarily. Much of the radio gear was destroyed. Some 20 feet of a 250 foot mast were knocked off. Another operator took over,

stand-by gear was activated, and in just a few hours the station was on the air again.

An old salt at today's nearby, almost abandoned Marshall Boat Yard told me, "Boaters don't like to anchor off that Marconi place. The water there's got more electrolysis than any place in the bay—just eats away at metal on boats. Those big, old, unused radio cables are still buried in the mud there, still causing trouble."

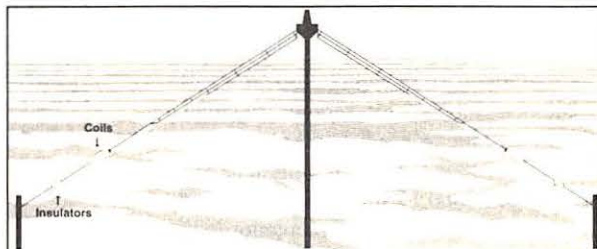
That yarn may be but another legend about

the sites. Even Marconi's visit to the stations is in doubt. Some reliable locals say that's a myth. But one resident of the area, Helen Harris, daughter of the original manager of the Marshall station, James Utman, she says she remembers Marconi visiting the site—"He used to bounce me on his knee when I was little."

In any event, the Marconi company ceased operating the stations on November 20, 1919, when RCA bought them.

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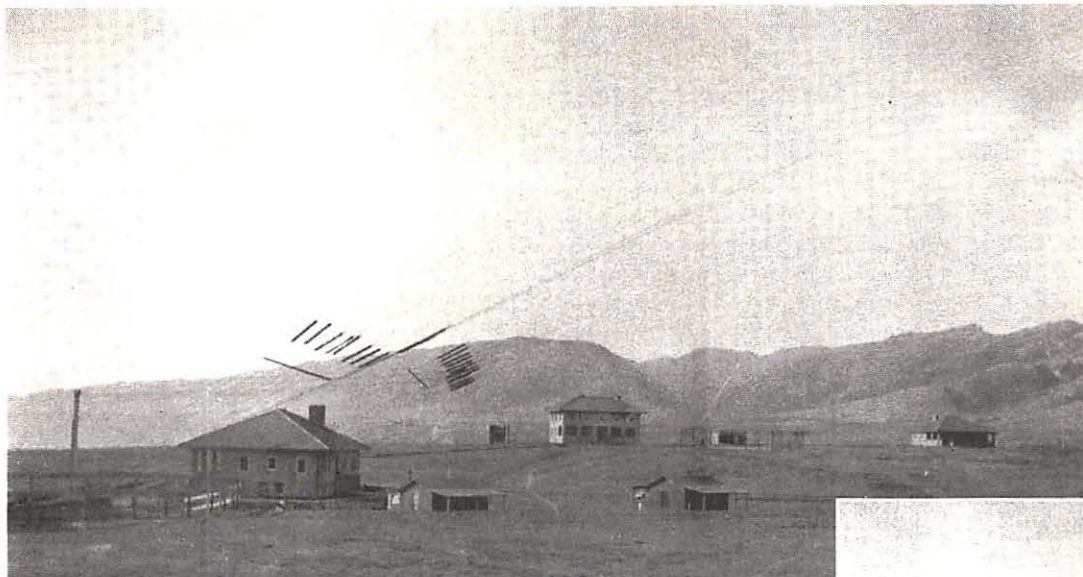
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At Marconi's transmitting station in Bolinas, California, large insulators on cables holding antenna towers seem to float in the air in this 1914 photo. The hotel and cottages for staff are in the background. (Photo from the Helen Harris collection.)

■ Structures

All of the original buildings, now more than 80 years old, remain; none are open to the public. The largest structure is the 22,000 square foot, two-story hotel that was for staff and visitors. From its wide veranda, the view of the bay and the ocean beyond is magnificent. The hotel included 32 single, double, and triple bedrooms, and 15 suites. All rooms had hardwood floors. A lounge and recreation hall, 25 by 35 feet, featured a huge fireplace. The dining room was almost the same size. That building is now used for storage.

Two five-room cottages, originally built as residences for the superintendent and his assistant, and their families, are now used for the same purpose. Nearby is the original receiving station, and a building which housed a steam plant, warehouse, machine shops, and generators.

All the Marshall buildings are within 500 feet of Tomales Bay, on an incline at about 160 feet.

On the crest, the operating building for the Marconi station in Marshall, California. (Photo from the Helen Harris collection.)



In 1915, these small buildings housed Marconi employees and construction workers. The dirt road going across the photo is now part of California's scenic highway #1. (Marconi Conference Center Archive, courtesy of Helen Harris)



AN OLD DOG LEARNS NEW TRICKS

Marconi's West Coast station, KPH, ceased operating on July 1, 1997, after being on the air for more than 80 years. In recent years KPH had been using high-speed Morse code and SITOR, a form of radioteletype, to communicate with ships at sea. Today, those channels have been replaced by satellites, telex, e-mail, and the Internet.

"There's not enough business left," said station manager Jack Martini.

The station was purchased from Western Union Int'l (a division of MCI, which bought the station in 1988) by Globe Wireless, which now owns a network of 15 stations worldwide. According to the *San Francisco Chronicle*, both the transmitting and receiv-

ing facilities will be closed, and the land (which still belongs to MCI) turned over to the National Park Service as part of the Point Reyes National Seashore.

Globe Wireless acquired the licenses of both KPH and another renowned Marconi station, WCC, in Chatham, Massachusetts. Although no longer manned, the stations will be linked with Palo Alto Radio KFS and Slidell Radio WNU to form its CW Super-Station®. The KPH call sign and frequencies are being transmitted from a former VOA site near Rio Vista, California. Experienced radio operators from the Global Wireless network operations center in Half Moon Bay, California, remote control transmitters, receivers, and antenna selection at all CW Super-Stations.

■ Today

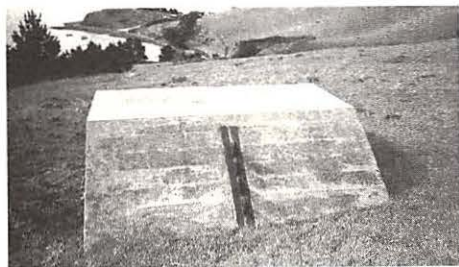
The state highway signs marking the limits of Marshall say, "Population 50." The shoreline hamlet sits exactly on what is now known as the San Andreas Fault, a 600-mile long earthquake route that is the most active, destructive, murderous in the nation.

When I visited the former Marconi station in Marshall recently, I hiked an unmarked, seldom-used path, up a steep hill, to stand beside each of the three remaining blocks of cement and steel that anchored cables supporting an antenna tower. Each block is an eight feet cube, buried in the hard soil so only a few inches are above ground. Protruding from each block are four heavy fittings to which cables had been attached. No towers are standing now, but in the center of another block, the former base for one of the towers, a two inch stub of the bottom of the tower remains; that tower appears to have been 12 inches in diameter. Other towers were reportedly 30 inches in diameter.

Today, 62 acres of the original Marshall station are the setting for the Marconi Conference Center, a non-profit facility. Its general manager, Wayne Zion said, "All the original structures on the property have been placed on the National Register of Historic Places."

The center's present configuration, completed in 1989, includes seven meeting rooms for groups ranging from ten to 106. The modernistic buildings include 40 guest rooms with a capacity of 96 people. Three meals a day are provided to those attending conferences. The facility does accept—occasionally, reluctantly—a few guests traveling independently, but rates are more than twice as much as other comparable state facilities.

A brochure distributed by the center in the spring of 1997 states that special arrangements for conferences "will be billed at a rate determined by Marconi." How the center communicates with him is not explained.



One of three remaining cement blocks which anchored cables supporting an antenna tower at the Marconi receiving station in California. The now rusted metal fittings which secured cables can be seen on the face of the block. (Photo by Leon Fletcher)

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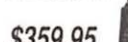
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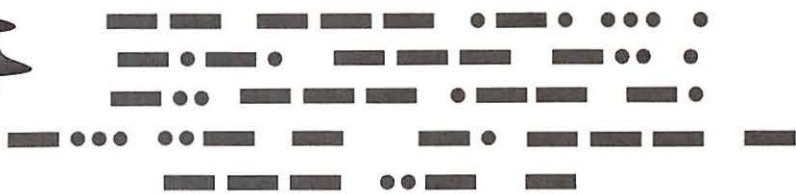
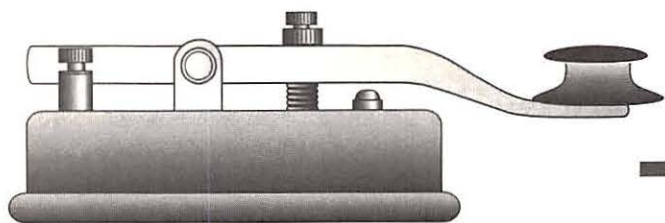
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"Morse Code: Down But Not Out"

By Arthur R. Lee, WF6P

When an ad appeared in a ham radio publication offering "part-time, full-time, temporary or permanent job as a Morse code commercial telegraph operator," Silicon Valley electronics engineer Rod Deacon thought it would be something he could do that would be fun. He applied for the position, took a code test (CW) and was hired on the spot. Two days later he was sitting in a message center circuit of commercial radio station KFS (now the headquarters for the Global Radio Network) in Half Moon Bay, California, "talking" to radio operators of ships at sea, anywhere in the world.

Being a ham radio operator since 1958, Rod has the call NR7E. He kept up with the hobby and was always an aficionado of CW. He can easily copy code at speeds up to 40 words per minute. Gone was the long freeway commute in bumper to bumper traffic jams. He now drove from his home to the beautiful seaside community via the scenic California coastal highway 1.

Operating commercial radio isn't quite the same thing as amateur radio. The operation of station KFS is strictly business. In the modern world of high speed computer and satellite telecommunications, one would think the language of "dits and dahs" sent by a telegraph key would be long gone and forgotten. Not true, at least for a certain segment of communications.

The first uses of Morse code wireless communications began with ships at sea. During WWI, the U.S. Navy was among the first to have a need for over-the-horizon communications to maintain contact with its ships at sea. Commercial vessels soon were able to avail themselves of this valuable service. Morse code was the first mode of communications, with voice modes not coming along until about the late 1920s.

Now, nearly 80 years later, Morse code is still being used and serving a highly useful

purpose. Where? At sea, on commercial vessels, almost where it began. Why? Many of these older, foreign flag vessels are operating on a very slim profit margin and with reduced crews. Money for new satellite communications equipment isn't in the budget of most shipping companies. It boils down to simple economics: modern, high-speed equipment is too costly when compared to a simple CW transmitter and receiver and a low-paid radio operator.

Until these older ships are retired from service and sold for scrap, there will be a need for message traffic to and from the vessels and their company owners. Messages such as position reports, vessel arrival and departure times, and requests or orders for changes in scheduling or cargo loading can all be passed by CW at low cost.

The radio traffic at station KFS is not quite 50% CW (down from 90% in 1995, when this article was first drafted). The on-watch operator wears a stereo headset to monitor various frequencies at the same time. The station sends out a continuous "CQ" (anyone out there want to talk to me?) on its 12 transmitters, all operating at the same time but on different bands. Using up to 4 kilowatts of power, they operate on the 4, 6, 8, 12, 6, and 22 meter bands. They also monitor the old emergency frequency of 500 kHz even though

the U.S. Coast Guard has discontinued doing so.

Figure 1 lists the calling frequencies for ships wishing to pass message traffic to stations KFS, WNU, KPH, and WCC—the four stations making up Globe's CW Superstation®. Once a contact is made, the shore operator selects a frequency and shifts the shipboard operator to a working band frequency for message traffic handling.

Although Rod works as an engineer for the station, he still "sits for the circuit" occasionally. "To keep my hand in," he says. "It can get pretty hectic around here at times."

Maybe a dozen messages have to be sent out, along with copying the incoming messages. A computer keyboard is used to type the incoming messages on a split screen. Billing of shipping companies is done by computer concurrent with the sending and receiving. The actual sending of CW is done with an old fashioned straight key, electronic keyer, or "bug," depending upon operator ease and preference.

"I once had to send a 50 word message using a straight key," added Rod. "I normally use a customized 'no dot memory' keyer, just because I like it. But on this particular day, I didn't have it ready, and was stuck with the straight key. I'll tell you, my hand and wrist got tired!"

Figure 1: The Globe Wireless CW network

Band	KFS Ship	KFS Shore	WNU Ship	WNU Shore	WCC Ship	WCC Shore	KPH Ship	KPH Shore
MF	500	476*	500	478*				
4	4185	4274	4183	4294	4282.5	4331		
				4310*				
6			6278	6389.65			6279.5	6477.5
8	8368.5	8444.5	8367	8525	8366.5	8586*	8368.5	8618*
		8558.4*		8570*				
12	12,552.5	12,695.5	12,551	12,826.5*	12,550.5	12,847*	12,552.5	13,002*
		12,884.5*		12,869		13,033.5*		
16	16,736.5	17,026*	16,735	17,038	16,734.5	16,972	16,736.5	17,016.8*
		17,184.4		17,117.6*		16,933.2*		
22	22,282.5	22,581.5*	22,281.5	22,575.5*				

* Morse code (CW) transmissions

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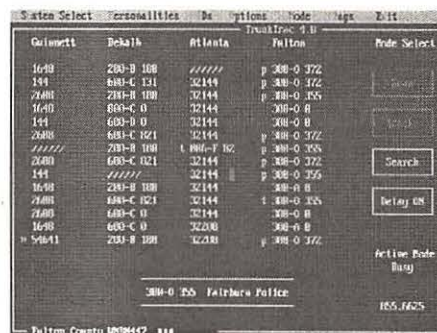
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Marconi:

Peering into

His Past in

Ireland

Story and photos by Finbarr O'Driscoll

Notre Dame was playing Navy in Dublin that week-end. Dublin in Ireland that is. "The Fighting Irish" from Notre Dame were to slug it out with Navy in Dublin, the Irish capital, that winter week-end in a competition-cum-exhibition of American college football.

It was just turning into grey November and there was rain between the showers, as the Killarney jarveys like to say in jest to tourists. The first of the winter's North Atlantic storms had recently blown in and knocked some trees and antennas about before leaving the country.

A long way from the hubbub in Dublin, my wife and I were sitting snugly down to dinner in a hotel over the mountains from home. The folks at a nearby table in the quiet dining-room of the hotel were from the United States. Occasionally, their conversation would rise and I heard: "Oh, we flew over to Dublin for the game on Saturday, and we decided to take a little detour in the meantime down here to Killarney. We're very glad. It's so beautiful." Some detour that — one hundred and ninety miles from Dublin on the east coast to County Kerry in the south-west. But they were right about

the beauty. The Killarney National Park is the jewel in the crown of unspoiled Irish scenery, summer or winter.

■ Blood Lines and Radio Links.....

I had done some detouring myself that week, but the distance that I had covered was not as great by road as it was in time. Twenty miles up the road I was able to go a hundred years back from the surroundings in which I was now sitting. At Kerry County Museum, in the town of Tralee, the exhibition "From Marconi to the Music of the Stars" was in its final weeks (forty thousand-plus visitors admitted) before returning to its home in Bologna, Italy. It was altogether irresistible.

The exhibition was officially opened earlier in the year by then Tanaiste Dick Spring (Irish Deputy Prime Minister) in the presence of Princess Elettra Marconi-Giovanelli. The Princess is the daughter by his second marriage (to Maria Cristina Bezzi) of the brilliant Italian radio pioneer. Originally, the exhibition was destined for Columbia University, New York,



Artist's impression of a young Marconi with his magnetic wave oscillator and coherer receiver (courtesy Irish Distillers-Jameson, Ltd)

but by successfully emphasizing Marconi's Irish links, the fighting Irish organizers scored the winning touch-down and the bulk of the beautiful exhibition came to Kerry County Museum. Nice going for Tralee, a town of just eighteen thousand people.

But Marconi's Irish connections were myriad. His mother was Irish (Anne Jameson, from the distinguished distillery family), his first wife was Irish (Beatrice O'Brien, born of old aristocratic stock), his first commercial use of wireless telegraphy was made in Ireland (in Dublin Bay), his first fixed station point-to-point telegraphy transmission was from Ireland (Clifden in County Galway), and his first transatlantic east-to-west voice broadcast radiated from Ballybunion in County Kerry.

Ballybunion is a mere seventeen miles north of Tralee, as the crow flies, just off the lower lip of the Shannon Estuary, facing the ocean and beyond that, North America. Having operated for seven years in tandem with the twin stations of Clifden and Letterfrack (both in County Galway), churning out hundreds of thousands of Morsed words weekly, Ballybunion sent the first ever east-west voice-cast in 1919. It was heard in Nova Scotia. That was a nice entry on the scoreboard for Guglielmo Marconi and his engineers, who were oblivious of the ionosphere and the vagaries of its layers. The transmitter is reputed to have been a modest two-and-a-half kilowatts.

The Ballybunion station must have been quite a sight. In addition to the large sprawling wooden building that was the nerve-center of the seventy acre site, a small railway led from it to a powerhouse. Seven masts raked the sky about the place. Half-a-dozen of these were three hundred feet high, but the ultimate one was a massive five hundred footer.

This goliath was a pinewood tower and got its strength from its cross-braced triangular design. Marconi had learned the hard way about masts. While preparing for his famous first transmission across the Atlantic in 1901, masts at Poldhu in Cornwall, England, and at Cape Cod in Massachusetts fell down in early winter storms. He rebuilt at Poldhu and then skedaddled to St. John's in Newfoundland with a kite-antenna. The rest, as they say, is history — not to mention a little controversy.

■ Doubters and the Redoubtable Marconi.....

Marconi recounted the reception by him of the Morse letter "S" on that day in December as follows: "Around twelve-thirty (pm), while

Ashe Memorial Hall houses the Kerry County Museum



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Single earphone magnetic detector. Definitive model produced by Marconi in 1902 at the Laboratory of the Italian Navy.

I was listening (with earphones), I heard three feeble beats, corresponding to the three dots of the letter 'S'."

But there were doubters. Not the least of the arguments against him, even in hindsight, is the one that proclaims the improbability of getting a mediumwave signal across the Atlantic at that time of day. The claimed frequency approximated eight hundred kilohertz, and the times noted in his diary were the aforementioned twelve-thirty, together with ten minutes past one o'clock and two-thirty.

A skeptic would do well to remember that these times of reception on the east coast of the North American continent correspond to the early hours of darkness of a winter's evening in Poldhu. The absorptive D-layer of the ionosphere would have dispersed over the transmission site, allowing skywaves to arch westward as required into the upper ionosphere. Add to that the low incident angle of the rays of the sun on a northern hemisphere's winter's day with a consequently weaker D-layer generally, and it is the hindsight argument which sounds feeble.

Marconi also recounts calling for confirmation from his assistant: "Do you hear anything, Mr. Kemp? He heard the same tapping." One does well to remember, too, that in those days the airways were utterly clear of other manmade signals. Those pioneers were listening for a repeated artificial pattern of three short clicks against a backdrop of cosmic hiss and randomly distributed atmospheric crackles.

It would have been hard to err, and Marconi had not erred before in parallel situations. Against all advice he had been right, way back in 1895,

when his brother Alfonso fired gunshots from a mile-and-a-quarter away to signal that he had received Marconi's wirelessly Morsed "S" from the other side of one of the Celestini Hills near Bologna. The feeble beats in his ear in Newfoundland were as good as those gunshots again, considering what they signified.

He had been right once more in his experiments at the British Post Office in 1896.

And a number of weeks after the Newfoundland experiment, while steaming east-west on yet another expedition, Marconi received Morse-inker signals fifteen hundred miles out from Poldhu. The famous letter "S" turned up yet again on earphones, this time at a distance of two thousand one hundred miles.

Nobody at the time apparently saw any significance in the fact that these phenomenal distances were spanned only at night. Daytime distances got steamed past. Thus the hindsight crux, perhaps.

■ Seeing Things.....

But, back to the exhibition at the Kerry County Museum. The instant I walked in, my eye was caught by the huge hexagonal silken kite, of the Newfoundland type, hanging from the ceiling. A thick, black, old antenna-wire dangled down from it to a heavy reel on the floor. Marconi's man could get that thing to fly to four hundred feet or so.

In glass cases everywhere, amid the info-boards, were the most amazing low-tech gad-

gets, wonderful antique items made with wood, glass, copper, brass. I was transfixed by the receiver in the cigar-box, a 1902 replica of Marconi's famous one. It contained so little, but it said so much with its soft-iron wire through a copper coil, set beside two horseshoe magnets. Such emblems of luck, but Marconi's pragmatic genius did not need much. The inside of the lid of the box was inscribed in Italian.

I went forward or backward in time, depending on which glass case I chose. In one was a Hertzian wave oscillator looking like a piece of sculpture and alongside it, wide open, a coherer receiver of the type used by Marconi in his London demonstration of 1896. In another case the display card said that I was gazing at a definitive model of a Marconi single earphone magnetic detector. The drive mechanism was derived from a gramophone of the time. This allowed automation of listening as the iron wire (in this case, loop) had been enabled to move continuously using the wind-up motor of the gramophone.

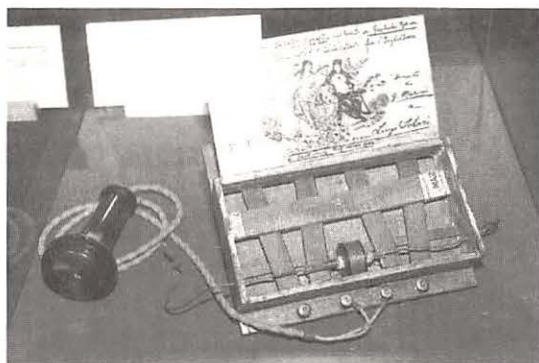
Marconi made this machine in the laboratory of the Italian Navy at the La Spezia Arsenal in 1902. What an ironic twist that seemed, knowing that the young inventor had failed an entrance examination to the Naval Academy at Leghorn seven years earlier. The University of Bologna also turned him down, probably because of his patchy and inadequate education at home and later at a technical institute.

Perhaps the most moving exhibit of all was not an apparatus, but a two page letter (an original) and accompanying envelope. The sepia handwriting looked swept and excited. The letter, dated the thirteenth of July 1898, was written by Marconi to his father, Giuseppi, who was at home in Bologna. Marconi was near Dublin, in the Royal Hotel, Kingstown (now Dun Laoghaire). The hotel looked out on Dublin Bay and the Irish Sea. He had just put wireless telegraphy to its first ever commercial use.

The story of the event is this: the *Dublin Daily Express* newspaper had engaged Marconi to supply an up-to-the-minute account of a local regatta. He hired a boat and slung an antenna from the mast. While steaming around near races he telegraphed (wirelessly, of course) the results to an on-shore base, from which they were telephoned to the Dublin newspaper. This simple feat proved to be a sensation. He was onto a winner, in the homeland of his mother.

■ Final Thoughts.....

Leaving the exhibition that day, I passed



Working replica of Marconi's 1902 magnetic detector. Like the first one built, it is housed in a cigar-box.

by an old man who was gingerly fingering a Morse-key on a display. The batteries in the circuit seemed to be dead and he was looking quizzically. Tucked away in a corner a couple of kids were clicking happily at a computer terminal. A sudden silence filled the great room when a loud video console came to the end of its commentary and began automatically rewinding.

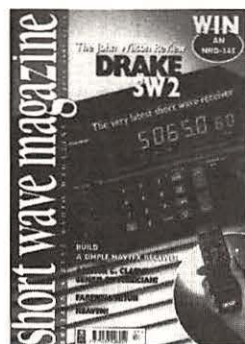
I stood at a rain-spattered window for a moment and looked down to the wet street, where antenna-topped traffic was swishing along and brake-lights were mistily blinking like diodes. I remembered what I once read of what happened the time in 1937 when Guglielmo Marconi died. Radio stations around the world fell silent. For a minute the airways of the world whispered only the mysterious murmurings of the cosmos. It was a touching and totally appropriate gesture.

[Acknowledgements. For certain clarifications: Mr. M. Connolly (Curator, Kerry County Museum); Mr. B. Van Gysel (Irish Distillers, Dublin). For permission to photograph exhibits: Staff at Kerry County Museum, Tralee, Ireland.]



The inside of a Marconi receiver of the type used in his London GPO demonstration, 1896.

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PCS Showcase

In September the city of Dallas hosted the Personal Communications Showcase '97, a PCS industry exposition where more than 600 vendors and 25,000 attendees gathered to display and examine the newest offerings in this rapidly growing market. The three-day trade show gave a number of companies the opportunity to announce new products and services.

■ Nokia 9000

Finland-based Nokia announced the availability of the 9000i Communicator, a 1900 MHz version of their combination wireless handset and personal digital assistant, from selected GSM operators in North America beginning October 14. The Communicator has been available in Europe since August of 1996.



The 13.9 ounce Communicator is first a fully-featured 1900 MHz GSM telephone with all the features PCS subscribers have come to expect, including Caller-ID and short messaging. Opening the unit lengthwise reveals a compact QWERTY keyboard and a liquid crystal graphics display. A call in progress will automatically be switched to the integrated speakerphone, freeing the user to take notes or perform other computer operations.

Powered by an Intel 386 microprocessor and sporting a total of eight megabytes of storage, the Communicator is also a miniature computer that includes a variety of application software running under the GEOS 3.0 operating system. GEOS, created by California-based Geoworks, is licensed to a number of manufacturers and provides a platform for third-party developers to create new and useful programs for mobile computing devices.

Using the Communicator's built-in software, the user can send and receive faxes and electronic mail, as well as browse the World Wide Web with a functional web browser. Customized preference settings can instruct the browser to skip downloading graphics images to speed up loading. Sites of interest can be stored in a "hot list" of pages for later review off-line.

Personal organizer software, an integrated calendar, and a contact database are also included. An infrared port and a serial port allow external printers, digital cameras, or other devices to interface with the Communicator.

■ PCS Handsets

Several equipment manufacturers have increased their marketing efforts in the wireless handset arena. OKI Telecom exhibited the Splash Phone, a water-resistant cellular telephone specially constructed to be weather- and spill-proof, as well as two CDMA-capable

units. Samsung launched their Wireless Systems Group and introduced several new products, including a wallet-sized CDMA phone. Sony showed off new CDMA handsets produced independently of Qualcomm, with whom they had partnered to produce several phones under the Qualcomm Personal Electronics banner.

■ Paging

Progress in paging continues as Motorola announced a number of new products, including a combination watch/pager and a two-way data device intended for remote telemetry applications.

Teaming with Timex, Motorola has created Beepwear, a compact, nationwide alphanumeric pager watch. The lightweight, water-resistant watch offers standard time-keeping functions including a stopwatch and Indiglo night lighting, as well as the capability of receiving word and/or numeric pages over standard 900 MHz FLEX paging networks. The unit can also be detached from the wristband and be carried in a pocket or worn around the neck on a cord.

Beepwear is scheduled for test marketing in Southern California during the fourth quarter of 1997 with a nationwide rollout in the first quarter of 1998. The units will be sold at retail electronics stores with an initial price of \$129.

Motorola is touting their Creatalink two-way data transceiver as a less expensive alternative for remote data collection and telemetry. Transmitting in the 901-902 MHz band and receiving in the 940-941 MHz band (Narrowband PCS), these sub-\$200 paperback-book-sized units utilize existing ReFLEX paging networks to send and receive data from remote locations.

■ Pagers with Keyboards

Research In Motion, based in Canada, introduced a handheld, two-way device that allows the user to send and receive messages over packet radio networks such as Ardis and RAM Mobile Data (see *PCS Front Line*, August 1997). The Inter@ctive pager weighs in at 8 ounces and is roughly the size and thickness of four packs of playing cards stacked together. A QWERTY keyboard and flip-up display provide wireless access to paging messages, electronic mail, and the Internet.





The user can receive messages, respond to those messages, and initiate customized messages. An Intel microprocessor and a software development kit (SDK) allow programmers to use industry-standard development tools to create additional applications.

Motorola announced that a similar product, the PageWriter 2000, will be offered through nationwide paging service provider SkyTel beginning fourth quarter 1997. The unit incorporates a tiny QWERTY key-

board to allow the user to create and send alphanumeric messages as well as receive pages and electronic mail. The unit can access information over the Internet as well as function as an address book and supports third-party applications.

■ More Auction Woes

The Congressional Budget Office recently estimated that as little as \$3 billion and no more than \$5 billion will be collected from the \$10 billion in bids offered in the PCS C-block auction held last year. Citing poor capital markets and falling wireless stock prices, several C-block bidders have threatened to file for bankruptcy and claim to be unable to make scheduled license payments.

The FCC had collected more than \$1 billion prior to their March 31 payment freeze, and is now considering a number of options to deal with the problem, including doing nothing. The FCC could reclaim licenses from defaulters, keeping their downpayments but releasing them from further obligation, and allowing them to enter the new auction.

Alternatively, the FCC could allow bidders to return a portion of their license for re-auction and get a proportional reduction in their debt. Bidders would give up that portion of their downpayment and would not be allowed to enter the new auction where the spectrum is resold. The FCC may offer other incentives for bidders to surrender licenses, and may allow bidders to select the option they wish to exercise.

The budget agreement worked out between the White House and Congress anticipates \$24.3 billion in revenues from future FCC auctions, including large amounts from the sale of television broadcast licenses. The loss of C-block revenue may increase the deficit for a particular year depending on when it is accounted for, and the entire issue is further complicated by the fact that three of the FCC Commissioners, including Chairman Reed Hunt, are scheduled to leave office soon.

■ Frequency Reallocation

The FCC is proposing to reallocate UHF television channels 60 through 69 for use by public safety agencies and fixed, mobile, and broadcasting services. The relatively unused channels, each six MHz wide and residing between 746 and 806 MHz, would be replaced by two bands of 12 MHz and two bands of 18 MHz.

The FCC cites a report from the Public Safety Wireless Advisory Committee (PSWAC) which found that "currently allocated public safety spectrum is insufficient to support current voice and data needs of the public safety community...and is inadequate to meet future needs..." and recommended an additional 24 or 25 MHz of new spectrum be set aside specifically for public safety use.

The Fixed, Mobile, and Broadcast frequencies would presumably be auctioned off for use by a variety of services and technologies, including cellular telephone, wireless local loop, and multimedia applications.

Table 1: Proposed FC Reallocation of UHF TV channels

Frequency Range (MHz)	UHF TV Channels	Proposed Service	Bandwidth
746 - 764	60 61 62	Fixed, mobile, and broadcasting	18 MHz
764 - 776	63 64	Public safety	12 MHz
776 - 794	65 66 67	Fixed, mobile, and broadcasting	18 MHz
794 - 806	68 69	Public safety	12 MHz

■ Iridium Update

Five more IRIDIUM satellites were launched from Vandenberg Air Force Base on August 20 using a Boeing Delta II rocket. This was the first launch for Boeing Space Systems, a company formed by the merger of Boeing and McDonnell Douglas earlier in the month. Seven more satellites reached orbit September 13 aboard a Proton rocket after launch from Baikonur Cosmodrome in Kazakhstan, bringing the total number of IRIDIUM space vehicles now in orbit to 29. Inside word is that IRIDIUM has undergone tests of their direct satellite-to-pager service and found good coverage, and in many cases acceptable signal penetration even inside buildings.

That's all for this month. You can find more information and links on the *PCS Front Line* web page at <http://www.grove.net/~dan>, and you can always send electronic mail to me at dan@decode.com. Until next month, happy monitoring!

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Acts of Congress – Part III

The Congressional soap opera continues here at *Monitoring Times*, but the outlook as of mid-September is one of guarded optimism.

Here's the latest on the House Resolutions (HR) 2369 and 1964 — bills which, as originally drafted, would effectively ban scanners:

On September 2nd I flew to Washington to meet with top aides of Congressmen on the Telecommunications Subcommittee. My first meeting was with legislative aide on telecommunications for Steve Largent (of NFL fame) from Oklahoma. I went with Steve Mansfield of the Amateur Radio Relay League (ARRL). The League is also quite concerned about the legislation and they were most gracious to invite me along to get my feet wet at lobbying. Mr. Mansfield proved to be a very knowledgeable and skilled advocate for the amateur radio cause.

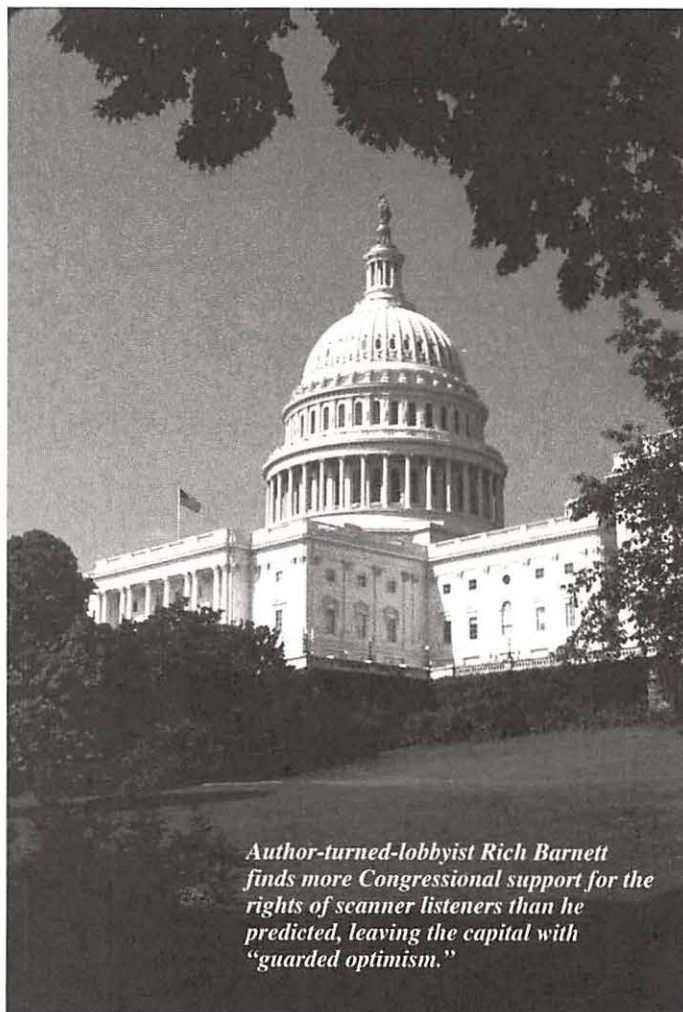
I then went on my own to see staffers for other Congressmen as well as Congressmen from my own state. My first meeting, and perhaps my most important, was with Colin Crowell, legislative aide for Congressman Markey — who "dropped" HR 1964 into the House a few months back and who represents the district in which my office is located. When the Democrats controlled Congress, Markey was the chairman of the Telecommunications Subcommittee. He's a powerful representative, particularly in regard to telecommunications issues.

What Colin Crowell told me mirrored what I was told by the aides for every other Congressman: they recognize the usefulness of scanners and the ability of Americans to monitor most communications, with the exception of cellular and PCS....which is all that they intended to protect with HR 1964 and HR 2369. The language of the bill will have to be fixed or clarified to make this clear.

Here's a copy of Colin Crowell's e-mail to me following the meeting, which reiterates this point:

Thank you for your e-mail and your recent visit. I want to again reiterate that no harm was intended to scanner users who wished to listen in to public safety, NASCAR events or other historically utilized and encouraged services. I believe this perceived problem in the bill is easily solved. As I told you during our meeting this week, we will look to you and the scanner community to help us craft appropriate legislative solutions to eavesdropping issues if legislation in this area appears that it will proceed at all. At this point no legislative action is planned on these proposals at all. If that situation changes I will contact you.

I came away from my meetings in Washington very impressed. All the aides I met with were generous with their time and most interested in what I had to say about the scanner-using community. While we all have had our moments where we've lost some faith in government, I was very pleased with the access I received and the level of concern that was shown. My only disappointment was that I did not receive a call back from Rep. Tauzin's office, and I did not,



Author-turned-lobbyist Rich Barnett finds more Congressional support for the rights of scanner listeners than he predicted, leaving the capital with "guarded optimism."

therefore, have the chance to meet with anyone from his staff. I know, however, that his staff has been meeting with others with similar interests to ours.

Should these Congressmen be true to their word and amend this bill to further protect cellular and PCS privacy rights, while sticking to the essence of the 1934 Communications Act and the ECPA, I'll be the first one to stand up and applaud the fine work of Rep. Tauzin, Markey, and all the other members of the Subcommittee.

■ What You Can Do

Because the situation is so fluid, it's best to check the Grove/Monitoring Times web site (www.grove.net) for the latest on the bills. As this article is being written, we're waiting to hear if/when the bills will push forward. It will likely only be 2369 that will move through the "mark-up" process and possibly to a hearing; we'll know

then if the language of the bill has been amended to reflect the concerns of the amateur, public safety, and hobbyist community. Thus, we have to wait and see what happens.

I'm counting on these Congressmen to be true to their word: that they'll fix the bill to protect cellular and PCS privacy, while maintaining the spirit and word of the 1986 ECPA which states, quite clearly, that it shall not be unlawful to monitor public safety, land-mobile, and other radio systems generally available to the public. (Interestingly enough, the cellular lobby, the CTIA, also stated this clearly in a press release handed out at a Tauzin press conference in late July).

If you want to keep gentle pressure on, below is a copy of a letter from a volunteer fire department to give you a sense of the arguments that really count. The philosophical argument, "I should be able to monitor any signal that passes through my home, including cellular," is going to get you laughed out of town. Millions upon millions of Americans expect their cellular and PCS calls to be private.

We know that if they want true privacy, they should use PCS, digital cellular, or, encryption. However, since most still use analog cellular, and since the party on the "land" end of the call may not know that his conversation is being transmitted over the airwaves, I agree with the argument that there is an expectation of privacy. I cannot argue with a Congressman who asks, "Why should you have the right to intercept a cell phone call any more than you should have the right to climb a telephone pole in front of your home and tap the lines?" Even if I had some ready retorts, and I could think of some, the argument will never be won. The philosophical fight is over.

There are, however, dozens of reasons why it is important for every American, especially if they're involved in public safety, to have the right to monitor public safety and most other communications. These arguments, which have been stated in prior issues, do hold water, and seem to be appreciated by Congress. Should you write letters to your Congressman (and you should copy Rep. Tauzin on these), we suggest that you focus on issues similar to those in the letter from the Oldsmar Volunteer Fire Fighters Association, Oldsmar, Florida.

Dear Congressman Tauzin:

The Oldsmar Fire Department is a combination fire department, which has both paid union and volunteer firefighters. We are against Bill HR-1964 & 2369 concerning limiting the access of scanning radio receivers to the general public, or including the 800 MHz spectrum which are referenced in HR 1964 and 2369.

The fire and police departments in Pinellas County Florida are all on an 800 MHz trunking system, and have been for about 5 years. Fire department members who owned scanners to monitor department calls found that they could no longer be as informed as they needed to be. The purchase of 800 MHz portable radios by volunteers is prohibitive when they cost \$700-\$1,000.

We currently utilize alphanumeric pagers to advise volunteers when a call is received, the map grid number, the 800 MHz channel it is being worked on and other units that have been called. That information is only of a basic dispatch nature. We as emergency personnel need to know much more about the call as it progresses.

I can give you two excellent examples. A few months ago, prior to the introduction of scanners that could "track" 800 MHz public safety conversations, we were dispatched to a "traffic accident." What volunteers didn't know was that it involved a

gasoline tank truck, and a carload of teenagers. Six patients, four dead on the scene, a hazardous materials incident, and threat of a major explosion and fire. Our first out engine was manned by only 3 firefighter-paramedics and one firefighter-EMT. To the volunteers at home in bed, this was just another accident call at 2 AM. Without scanners we were kept in the dark as to the nature of the call, and could have endangered ourselves had we taken a route to the station that was near the scene, with a tank truck leaking gasoline.

My second example occurred last week at ten minutes to one in the morning. Our engine was dispatched by itself on a routine call to a general area to investigate an "odor of smoke." During this call I turned on my new 800 MHz trunking scanner and followed the call. The engine crew searched the area, but could not locate the source of smoke. Since there was smoke, I thought that I should respond to the station and ready the other trucks if necessary. I was alone at the station when the engine found the source of smoke — a mobile home that was fully engulfed in flames.

Within a minute or so, a working fire call was put over the pagers and it was five more minutes before other firefighters arrived at the station to assist our friends at a dangerous situation. By now the first on-scene engine was running low on water, and an interior search had not yet been accomplished due to the volume of fire. Having a scanner for every volunteer could have cut minutes off our response time. The mobile home was totally destroyed, but thankfully, there were no injuries.

There are times when the first out unit is cancelled while en route to a medical call, because a closer unit becomes available and will take the call. The volunteer firefighters and emergency medical technicians responding to the station to cover the next possible call, have sometimes found the crew back at the station and getting back into bed! Had we had scanners like we used to, they would have known the engine was available, and they could have returned home to their families.

Off duty, our firefighters and EMTs have heard on their scanners of accidents or heart attacks just around the corner from them and have been able to render aid minutes before the first arriving rescue unit. We all know that sometimes the saving of a life is measured in seconds.

And finally, some of our spouses use scanners to listen to their husbands or wives when they are working, and by knowing what type of call they are on, can determine if they are going to be home on time, or satisfy themselves that their loved ones are safe. I myself listen to my wife who works for the Pinellas County Sheriff's Office, and it gives me great relief to know she's okay when I hear her at the scene of a homicide or bank robbery.

It has been our experience that people who listen to scanners for recreation are also concerned about their neighborhoods and helping others. I know that when the Sheriff's helicopter is circling my neighborhood, they are looking for a possible felon who had just committed a crime. I know that if I see that person after hearing their description on my scanner, that I would notify the police and tell them whatever information I have that would assist them in apprehending this criminal.

Scanners should not be just limited to public safety personnel. Many people have been saved by concerned listeners, and when a crime is committed, there are that many more eyes searching for the perpetrators.

Sincerely,
Jeffrey W. Milges, Department Secretary

■ Back to the Frequency Files

Back to more mundane issues, here's a letter we received from Rory B. McEvoy with frequencies and information from outside U.S. borders:

"As a longtime scanner 'nut' I cannot resist dropping you a few lines regarding the ideal portable scanner (discussed in the July *MT*) and your own suggestions. If I make no comment, then I agree with your specs or suggestions.

Trunk Tracking Systems: In Canada (and Europe) we need the Ericsson system to be included. Outside the USA, use of Ericsson systems significantly exceeds Motorolas.

Mode Default Override: This is essential in handhelds used by travelers. We've taken scanners to and used them in Europe, South America, and the Caribbean. Also need to be able to select FM SSB on 225-400.

Bank-Channel Ratio and Full Channel Programmability: More banks with less channels. Preferably, as in my Regency TS2, the flexibility to program each bank for any sequential group of channels, including the ability to allow banks to overlap. (See enclosed printout of my TS2 banks for better illustration.)

Antenna Connectors: N type in preference to BNC for all bands, in particular the 800 MHz trunk systems. (I'm using the 5dB gain cellular antennas on my handheld scanners for local PD, FD, and ambulance.)

Input Channels: Ideally, the ability to program the input frequency as a 'B' frequency for each channel on a non-trunked system. Scanner would normally scan only 'A' frequencies, but when the radio user such as police 'goes direct,' then the 'B' input channel could be selected manually.

Ultimate, Ultimate Scanner: Full coverage of all above, plus your wish list, plus ability to receive digital transmissions as used by Cleveland and Edmonton police departments.

For your information, digital scanners, when they do become available, will be illegal to possess even in Canada. Digital scanners will be individually licensed and controlled by serial numbers available only to specifically authorized agencies. It will be illegal for licensed users to dispose of digital scanners without specific approval from Industry Canada.

Hope this is of some help. Should you wonder about the frequencies in the TS2, it's a fantastic radio for airband, second only to my Signal R535 from England."

Here's Rory's programming for his Regency Turbo Scan TS:

Banks Programmed

Bank 1	Chs. 04-07	Pearson	Arrival
Bank 2	Chs. 08-13	Pearson	Tower
Bank 3	Chs. 14-20	Pearson	Ground
Bank 4	Chs. 21-27	Pearson	Departure
Bank 5	Chs. 28-39	Toronto	Centre
Bank 6	Chs. 57-62	Toronto	Island

Frequencies

Ch.	Frequency	Service and Usage
01	121.500	Emergency
02	120.825	Toronto Pearson - Primary ATIS
03	133.100	Toronto Pearson - Secondary ATIS

Pearson Arrivals

04	125.400	Toronto Pearson - Primary Arrivals
05	124.475	Toronto Pearson - Secondary Arrivals
06	134.175	Toronto Pearson - ILS Monitor
07	121.500	Emergency

Pearson Tower

08	118.000
09	118.350
10	118.700
11	119.300
12	119.775
13	121.500

Pearson Ground, Apron, Ramp

14	121.650
15	121.900
16	122.075
17	122.275
18	122.875
19	130.675
20	121.500

Pearson Departures

21	121.300
22	124.100
23	124.925
24	127.575
25	128.800
26	133.400

Toronto Centre

28	127.000
29	128.275
30	132.175
31	132.575
32	132.800
33	133.300
34	133.400
35	135.625
36	125.775
37	134.575
38	134.925

Cleveland Centre

39	135.425
40	120.625
41	125.200
42	127.675
43	132.250
44	133.875
45	134.775

Minneapolis Centre

46	125.825
----	---------

Buttonville

47	119.200
48	119.900
49	121.800
50	122.350
51	123.150
52	123.500
53	124.800
54	126.700
55	127.100
56	121.500

Toronto Island

57	118.200
58	119.200
59	121.700
60	122.750
61	129.275
62	132.550
63	133.600
64	123.100
65	123.400
66	123.450
67	123.600
68	124.100
69	126.400

Canfords Military

70	122.600
71	122.900
72	123.100
73	125.650
74	126.200
75	128.400

Toronto Pearson - Tower/Final Approach
Toronto Pearson - Tower South
Toronto Pearson - Tower North/Primary
Toronto Pearson - VFR Transit Clearance
Toronto Pearson - ATC
Emergency

Toronto Pearson - Ground, North Side
Toronto Pearson - Ground, South Side
Toronto Pearson - Apron T1, T2 Primary
Toronto Pearson - Apron T1, T2 Secondary
Toronto Pearson - Apron, Terminal 3
Toronto Pearson - Ramp, Terminal 1
Emergency

Toronto Pearson - Clearance Delivery
Toronto Pearson - Departure
Toronto Pearson - Departure
Toronto Pearson - Alternative Departure
Toronto Pearson - Departure
Toronto Pearson - Departure

Toronto Centre - Post Departure
Toronto Centre - LA
Toronto Centre -
Toronto Centre - NW LA
Toronto Centre - NE LA
Toronto Centre - S LA
Toronto Centre -
Toronto Centre - W LA
Toronto Centre - High Altitude
Toronto Centre - High Altitude
Toronto Centre - High Altitude

Cleveland ARTCC
Cleveland Centre
Cleveland Centre - East
Cleveland Centre
Cleveland Centre
Cleveland Centre
Cleveland Centre

Minneapolis

Toronto Buttonville - Approach
Toronto Buttonville - Tower
Toronto Buttonville - Ground
Toronto Buttonville - Radio
Toronto Buttonville - Radio FSS
Toronto Buttonville - PVT Advisory
Toronto Buttonville - Tower Primary
Toronto Buttonville - Stirling en route
Toronto Buttonville - ATIS
Emergency

Toronto City Centre - Tower Primary
Toronto City Centre - Tower
Toronto City Centre - Ground
Toronto City Centre - Harbour Commission
Sunnybrook Medical Centre - Heliport
Air Ambulance - alternate frequency
Toronto City Centre - ATIS
Toronto "BOSS CONTROL" - CNE Air Show
Toronto City Centre - Air Show alternate
Toronto City Centre - Air Show alternate
Toronto "BOSS CONTROL" - Air Show alternate
Toronto City Centre - CNE Air Show alternate
Toronto City Centre - Show Time Control

Toronto Downsview - Search and Rescue
Toronto Downsview - Search and Rescue
Toronto Downsview - Search & Res. Primary
Toronto Downsview - Tower
Toronto Downsview - Air/Ground
Trenton Radio

NOTE: If it's necessary to add a frequency to any bank, one can use the 121.5 space and reprogram the bank channels. For example: To add the military frequency to tower, I'd program 126.2 in ch. 13 and program bank 2 to include chs. 07-13. Bank 1 would still include ch. 7.

Bearcat Intercepts Trunked Radio

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Frequency Coverage:

25,000-549.995 MHz., 760.000-823.995 MHz., 849.0125-

868.995 MHz., 894.0125-1,300.000 MHz.

The Bearcat 3000XLT is the ideal handheld radio scanner for communications professionals. This handheld scanner scans at 100 channels per second and searches at a rate up to 300 steps per second. A selectable attenuator eliminates annoying intermodulation from adjacent frequencies in highly populated areas.

Selectable AM, Wide FM and Narrow FM modes allow you to change the default receiving mode of the BC3000XLT. For maximum scanning pleasure, order the following optional accessories: UA502 Cigarette lighter power cord for temporary operation from your vehicle's cigarette lighter \$14.95; LC3000 Deluxe swivel leather carrying case \$34.95; BP2500 rechargeable nickel-cadmium battery pack for up to five hours of dependable use \$29.95; ANTMBCNC Magnetic mount scanner antenna with BNC jack and 12 feet of cable \$29.95. ANTSGBC Glass mount scanner antenna with BNC cable \$29.95. The BC3000XLT comes with AC adapter, belt clip, flexible rubber antenna, earphone, owner's manual and one year limited Uniden warranty. Order today.

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500 Channels • 20 banks • Alpha numeric display

Size: 10-1/2" Wide x 7-1/2" Deep x 3-3/8" High

Frequency Coverage: 25,000-549.995 MHz., 760.000-823.995

MHz., 849.0125-868.995 MHz., 894.0125-1,300.000 MHz.

The Bearcat 9000XLT is superb for intercepting communications transmissions with features like TurboSearch™ to search VHF channels at 300 steps per second. This base and mobile scanner is also ideal for intelligence professionals because it has a selectable attenuator to help eliminate annoying intermodulation from adjacent frequencies in highly populated areas and selectable AM, Wide FM and Narrow FM modes that allow you to change the default receiving mode of the BC9000XLT. Other features include Auto Store - Automatically stores all active frequencies within the specified bank(s). Auto Recording - This feature lets you record channel activity from the scanner onto a tape recorder. Hi-Cut filter to help eliminate unwanted static noise. You can even get an optional CTCSS Tone Board (Continuous Tone Control Squelch System) which allows the squelch to be broken during scanning only when a correct CTCSS tone is received. For maximum scanning enjoyment, order the following optional accessories: PS001 Cigarette lighter power cord for temporary operation from your vehicle's cigarette lighter \$14.95; PS002 DC power cord - enables permanent operation from your vehicle's fuse box \$14.95; MB001 Mobile mounting bracket \$14.95; BC005 CTCSS Tone Board \$54.95; EX711 External speaker with mounting bracket & 10 feet of cable with plug attached \$19.95. The BC9000XLT comes with AC adapter, telescopic antenna, owner's manual and one year limited Uniden warranty.

TrunkTracking

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300 Channels • 10 banks • Trunk Scan and Scan Lists

Trunk Lockout • Trunk Delay • Extra battery & charger

10 Priority Channels • Programmed Service Search

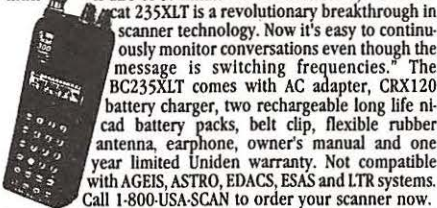
Size: 2-1/2" Wide x 1-3/4" Deep x 6" High

Frequency Coverage:

29,000-54,000 MHz., 108-174 MHz., 406-512 MHz., 806-823.995 MHz.,

849.0125-868.995 MHz., 894.0125-956.000 MHz.

The Bearcat TrunkTracker BC235XLT, is the world's first scanner capable of tracking a selected radio transmission as it moves across a trunked radio system. Now it's easy to monitor fleets and subfleets in analog trunked radio systems. The BC235XLT can also work as a conventional scanner. This 300-channel, programmable handheld scanner provides scanner users with uninterrupted monitoring capabilities of Type I, II, III and hybrid trunking systems. One of the biggest obstacles in the scanner industry has been the increasing use of trunking radio systems in business and public agencies throughout the United States and Canada. This makes it nearly impossible to track a conversation as it moves within a trunk system from frequency to frequency. According to Ken Ascher, WB8LIT, Chair- & CEO of Communications Electronics, "The Bearcat 235XLT is a revolutionary breakthrough in scanner technology. Now it's easy to continuously monitor conversations even though the message is switching frequencies." The BC235XLT comes with AC adapter, CRX120 battery charger, two rechargeable long life nickel cad battery packs, belt clip, flexible rubber antenna, earphone, owner's manual and one year limited Uniden warranty. Not compatible with AGEIS, ASTRO, EDACS, ESAS and LTR systems. Call 1-800-USA-SCAN to order your scanner now.



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Aero O.R. Changes Revisited

In 1992, a World Administrative Radio Conference (WARC) was conducted by the International Telecommunications Union (ITU) in Malaga, Spain. Diplomats from around the world gathered at this conference to establish the rules and regulations that govern the radio frequency spectrum.

Right about now some of you are probably saying, "Hey, Larry, they hold these conferences every few years; what's so important about WARC 92?"

Actually the answer is quite simple. All of us that listen in the utility bands overlooked an appendix in the final acts of WARC 92 that made a significant change to the shortwave spectrum. This conference finally channelized the one remaining aeronautical sub-band not previously addressed in previous WARC conferences.

For folks new to the *Utility World*, the aeronautical bands located in the high frequency spectrum are divided into two distinct sub-bands. The first sub-band is most familiar to HF aviation buffs, the "R" or routed frequencies. This sub-band contains communications associated with aircraft (civilian and military) that are flying on established aeronautical routes anywhere in the world. Communications in these frequencies consist of air traffic control, weather information, and private airline company traffic. The "routed" sub-band was re-channelized several years ago and spacing was established at 3 kHz between frequencies at an earlier WARC conference.

The other aeronautical mobile sub-band traditionally has been more obscure to all but military monitors. Dedicated readers to the yearly Klingenfuss *Guide to Utility Stations* books will recognize the

term "OR," which stands for off-route. Military listeners have prowled the "OR" sub-bands for years listening to the heavy concentration of military aeronautical traffic that occurs in them. The military does a lot more off-route flying than the civilian aviation population.

In the final acts of WARC 92, Appendix 26, the aeronautical mobile "OR" frequencies were channeled and standardized to a spacing of 3 kHz like its cousin, the routed frequencies. Radio administrations worldwide have until December 15, 1997, to implement this change.

It has been nearly three years since this column first published the fact that the aeronautical off-routed frequencies were being reorganized. Since that time, intercepts have poured in from all over the world giving us a clearer picture of activity on these new OR frequencies.

However, now that we are approaching the December 15, 1997, cutoff for this plan to be implemented, it is time we radio hobbyists concentrated our attention on these frequencies. Quite a few U.S. agencies and foreign military have not made the change-over to the new spacing (i.e. — Mystic Star, etc).

Starting at midnight on December 15, we could see some frequencies in the OR ranges disappear from use forever. I would like each of our *MT UW* readers to watch the OR bands starting December 15 and let us know what you hear within these ranges in the way of changes. You can send your reports to Project OR, P.O. Box 98, Brasstown, NC 28902. You can also contact us via e-mail.

Table 1 is a frequency profile of the aeronautical OR bands of actual channel usage as reported by *MT UW* readers over the last three years.

TABLE 1: Annotated HF Aeronautical OR Bandplan

Frequencies are in kilohertz (kHz). Frequencies in italics indicate frequencies with activity that are not part of the new OR bandplan. Abbreviations and acronyms can be found on page 36. In the first column are frequencies and authorized users. The second column denotes observed activity.

3026-3152 kHz

3026 AF USAF ALE channel/RAF channel WM
3029 AF USAF Mystic Star
3032 AF USAF Mystic Star F-690/FUI-FAF unknown location (ARCN 171)
3035 N
3038 N
3041 AF RAF channel AK
3043 O Encrypted RTTY
3044 AF CanForce primary/FUI/FLZ-FAF unknown locations
3046 O USAF Mystic Star F-186
3047 N CanForce primary-Halifax Military
3049 O Link 11 transmissions
3050 N
3052 O Encrypted RTTY
3053 CG USAF Mystic Star
3056 CG
3057 O USAF Mystic Star
3059 AF USAF ALE channel-Scope Command
3060 O USAF Mystic Star
3062 AF
3064 O USAF Mystic Star F-673
3065 AF
3068 AF Stratcom Zulu 100
3071 AF USAF Mystic Star
3074 AF USAF Mystic Star
3077 AF
3078 O USAF Mystic Star F-182
3080 AF
3083 N RAF channel BF
3085 O Encrypted RTTY

3086 N
3089 N
3090 O Encrypted RTTY
3092 N RAF channel LB
3095 N RAF channel QV/NATO units noted here
3097 O NORAD [callsign Sidcar]
3098 N
3101 N RAF channel FA
3103 O Encrypted RTTY
3104 N
3107 N
3109 O DHM91-GAF Munster Air, Germany (Alpha)
3110 AF USN tactical comms noted here
3113 AF RAF channel RM
3116 AF USAF Mystic Star F-777
3119 CG Tentative STRATCOM Zulu 105/ USAF Mystic Star
3122 CG RAF channel CY
3125 N USCG Air to ground/ANDVT comms noted on this frequency
3127 O RAF channel WG/ALE burst
3128 N 75 baud encrypted RTTY
3130 O
3131 N USN tactical channel/FACSFAC Jacksonville [callsign Sealord]
3133 O RAF channel FW
3134 AF Encrypted RTTY
3137 AF STRATCOM Zulu 110
3140 AF USAF ALE channel-Scope Command
3143 AF VFT signals noted here
3144 O STRATCOM Zulu 115/DHM91-GAF Munster Air, Germany (Bravo), IDR-IAF Rome, Italy
3146 AF USAF Mystic Star F-380
3149 N
3152 N CanForce Vancouver Military

4700-4745 kHz

4700 N CanForce-Halifax Military
4703 N Link 11 transmissions/USN Pacific ASW Net (4704.4) [callsign Habitat-Whidbey Island, WA]

4703.5 USAF (channel M-72) EC-135 based at Mildenhall/Danish AF-Aalborg/NATO Army
4706 N RAF channel D
4707.5 Unid U.S. military units
4709 N RAF channel TW
4711 O 75 baud Encrypted RTTY/ICM-Italian Naval Radio unknown location
4712 N
4715 N Former RAF Volmet channel (left for 5450 kHz)
4716 O Air Northwest (UK) off-shore coordination
4717.5 Air Northwest (UK) off-shore coordination
4718 AF RAF channel KJ
4721 AF USAF Mystic Star F-877/NORAD Golf 20/USAF ALE Channel-Scope Command/USN FT Net/DHM91-GAF Munster Air, Germany (Delta), IDR-Italian Navy Rome, Italy
4722 O Possible USN Adriatic frequency
4722.5 Possible USN Adriatic frequency
4723 O IDR-Italian Navy Rome, Italy
4724 AF GHFS primary house channel/RAF channel UA
4724.5 IAF frequency
4727 AF
4729 O Italian Navy/IAF frequency
4730 CG
4731 O USAF Mystic Star F-249
4733 CG
4736 N
4738 O Encrypted RTTY
4739 N RAF channel DS/British Royal Navy
4742 AF USAF Mystic Star F-058/RAF channel FS/CTP-NATO Naval Radio Lisbon, Portugal
4744 O RAF Buchan/DHJ64-German Naval Radio, unknown location/JWT-Stavanger Naval Radio, Norway
4745 AF STRATCOM Zulu 135/RAF channel AG/GHFS and/or PACAF discrete/ DHJ59-German Navy/ONY-Belgium AF/Kinloss Rescue

6685-6760 kHz

6685 AF USAF ALE Channel

8965-9037 kHz	
8965 AF	ALE pulses noted here/DHM191-GAF Munster Air (Kilo), Germany
8965.5	USAF GHFS discrete-Thule/Trigraph callsigns noted here
8967.0	USAF AWACS/Antarctica comms/ANDVT comms noted here
8968 AF	GHFS primary house channel
8969.5	ANDVT comms noted here
8970.0	Kuwaiti AF channel
8971 N	USN Atlantic safety of flight (Kilo)/RAF channel PH
8972.0	USAF Dictate/Chevy Ops-Incirtic CP/RAF channel QR/FAF channel Racontar 1
8972.6	ANDVT comms noted here
8974 N	RAAF, Sydney/Darwin/Perth/Townsville/PJK-Dutch Naval Radio Sulfysant Door Curacao, Netherlands Antilles
8975.0	ZS Silvermine, RSA (SAR missions)/RAAF, Sydney/Townsville
8977 N	USN Pacific ASW Net (8978.5) [Habitat]
8980 CG	USCG air to ground (ANDVT noted)/RAF channel J
8983 CG	USCG air to ground/RAF channel HJ
	USAF ALE channel
8988.0	75 baud encrypted RTTY
8989 AF	USAF Mystic Star F-500/RAF channel BX/CanForce/Belgian AF channel YG
8992 AF	GHFS primary house channel/Portuguese AF-Lisbon/FAF/RNZAF/CanForce-Halifax Military
8993.0	FAF channel Vinaigrette 3/USAF discrete-McClellan
8995 N	
8997.0	Encrypted RTTY/RNZAF/Antarctica comms/USN tactical aircraft callsigns
8998 N	RAF channel DM/Antarctica comms
9001 N	
9002.0	Possible USN ASW activity here from 6693 kHz
9004 N	USN Pacific ASW Net (9005.4) [Habitat]
9006.0	USAF Mystic Star F-505/FAF/Two letter tactical calls noted here

11175-11271 kHz	GHFS primary house channel
11175 AF	USN Bluestar/Dutch Military Caribbean frequency
11178 AF	Blackhat/Promenade-352SOG CP (Europe)/JWT-Norwegian Navy Stavanger/GHFS discrete-Croughton
11180.0	STRATCOM Zulu 200/GHFS discrete/RAF channel AP/PJK-202 Naval Radio Suffisant Dorp Curacao, Neth Antilles
11183.0	Tactical call Xray 27 with ANDVT comms
11184 N	RAF channel EX
11187 N	Stratcom Wing One - channel CB [Boomtown-USN Tinker]
11190 N	Boomtown-USN Tinker working tac calls/USN UG-trigraph traffic
11191.0	Pipeline working Gonzo 04 Delta setting up RTTY circuits (also 5700/6712/11193.3)
11192.0	CSY-Santa Maria Air, Azores 50 baud RTTY
11193 N	Pipeline working Gonzo 04 Delta setting up RTTY circuits (also 5700/6712/11191)
11196 CG	
11199 CG	
11202 CG	USCG air to ground
11203 N	Link 11 transmissions
11205.0	USN/NOAA trigraphs (including Diego Garcia)/RAF channel A
11208 N	RAF channel PG/Link 11 transmissions
11209.0	USAF Mystic Star
11211 N	USN Pacific ASW Net (11212.4) [Habitat]
11213.0	Encrypted RTTY - Possible UK Royal Navy
11214 AF	USAF Mystic Star F-064/GHFS discrete/AWACS/CanForce
11215.0	Parkhill encryption noted here
11217 AF	USAF Mystic Star F-124/GHFS discrete/Casey Control working aircraft during 9/97 exercise/DHMS1-GAF Munster Air (Mike), Germany/RAF channel VE/Dixie Control-117 ARW/106 AFS (ALANG), Birmingham, AL command post, also on 11234.5 kHz
11218.4	Gulpost 21 heard calling Birmingstam 21 Alpha
11220 AF	USAF Mystic Star F-311/GHFS discrete-Croughton
11223 AF	Canada/Alaska shared frequency/ALDE burst and ANDVT noted here
11226 AF	USAF ALE channel-Scope Command/USAF Mystic Star F-287/GHFS discrete/Parkhill scrambling noted here
11227.5	Bookshelf/Nightbird/Hazard/Shark 71
11228.0	Blackhat/Promenade-352SOG CP (Europe) Channel H3 (ex-V)
11229 AF	STRATCOM Zulu 210/USAF Mystic Star F-823/GHFS Discrete
11230.0	UK Royal Navy AAWC HF Coordination frequency X405D/Possible French allyplayground net-Cyrano
11232 AF	USAF Mystic Star F-522/CanForce primary
11234.5	Dixie Control-117 ARW/106 AFS (ALANG), Birmingham, AL, command post, also on 11217 kHz
11235 AF	RAF channel EK/RAF channel/RNZAF-Kiwi Ops
11236.0	USAF Mystic Star F-728
11238 AF	Canada/Alaska shared frequency
11241 AF	RAF channel YC
11244 AF	GHFS discrete channel (primary)
11246.0	Primrose-Royal Danish Air Force Vaerlose
11247 AF	CanForce primary/RAF channel HW
11250 AF	USAF ALE channel-Scope Command/CanForce Primary
11253 N	RAF Volmet
11256 N	
11256.5	Trigraph tracking net monitored in Sweden
11258.0	USN units Brownrat/Topkick
11259.0	USN BW net (JTFCX 97-1)/RAF channel EH
11262 N	
11265 N	Tactical calls noted here with EAM traffic, parallel to 6697 kHz
11267.0	Occasional USN units here with EAM broadcast on old Navy HICOM
11268 N	RAF channel BL/Belgian AF channel YJ
11271 AF	CanForce primary/GHFS discrete

13206 AF USAF Plantation Ops (AFSOC)/RAF channel HO/RAAF/
NORAD [Sidecar]
13207 0 USAF Mystic Star F-885
13208 5 USAF 105 AW command post Stewart ANGB, NY
13209 AF USAF ALE channel
13211 0 USAF Mystic Star F-461/RAF channel YM/GHFS Croughton
13212 AF
13215 AF
13217 0 USAF Mystic Star F-251
13218 CG RAF channel FT/Western Test Range frequency [Abnor-
mal/Aria Control]

13221 CG
13224 N
13226 0 75 baud encrypted RTTY
13227 N
13230 N Russian military, possible AF (CW)
13233 N
13235 0 Encrypted RTTY
13236 N RAF channel I/FAF-Raphael
13239 N
13240 0 Green Sky heard here with EAM traffic
13241 0 USAF Mystic Star F-624
13242 AF STRATCOM Zulu 215/GHFS discrete
13244 0 GHFS discrete-Ascension/USCG COMSTA Kodiak (also
11202)
13245 AF STRATCOM Zulu 220
13246 0 USAF Mystic Star possible F-874
13247 0 USAF Mystic Star F-099
13248 AF USAF Mystic Star F-451/RAF channel HZ
13251 N
13254 N
13255 8 USN Link 11 transmissions
13257 N RAF channel F/Link 11 transmissions/CanForce

15010-15097 kHz	
15010 AF	CanForce primary/Belgian AF frequency
15011.0	USAF Mystic Star F-732/Lightning Base working Lightning Mobile (also 17457.0)
15013 AF	RAF channel DH
15015.0	Belgian AF channel YM
15016 AF	GHFS primary house channel
15018.0	USAF Mystic Star F-363
15018.5	USAF Mystic Star/EC-135 tactical channel Europe [Masterpiece, Pink Tiger, Clean Table, Mystery Ship] (H designer) UHF 389.5/324.0 WB
15019 N	Encrypted RTTY
15021.0	
15022 N	
15025 N	RAF channel EM
15028 N	
15031 AF	CanForce Primary/RAF channel H
15034 AF	CanForce MACS weather
15036.0	USAF Mystic Star F-066
15037 AF	
15038.0	USAF Mystic Star F-948
15040 AF	RAF channel EP
15041.0	USAF Mystic Star F-236/GHFS discrete-Croughton
15043 AF	USAF ALE channel-Scope Command/GHFS discrete
15046 AF	STRATCOM Zulu 230/RAF channel LD
15048.0	USAF Mystic Star F-662
15049 N	EAM broadcast noted here from unit unit
15050.0	Shortwave broadcast station (AM)
15052 N	
15055 N	
15056.5	Unit type data signal
15058 N	
15061 N	RAF channel GA
15064 N	RAF channel FV
15067 N	
15070 N	
15072.0	RAF channel LE
15073 N	
15076 N	RAF channel EN
15079 N	
15082 CG	
15084.0	Shortwave broadcast station (AM)/EAM broadcast here by unit unit
15085 CG	
15087.0	USAF Mystic Star
15088 CG	
15091 AF	USAF Mystic Star F-250/RAF channel DB
15094 AF	USAF Mystic Star F-382/USN Pacific ASW Net (15095.4) [Habitat]
15095.0	Shortwave broadcast station (AM)
15097 AF	STRATCOM Zulu 240

17970-18027 kHz	
17970 N	RAF channel BA
17972 F	USAF Mystic Star F-009
17973 AF	GHFS discrete
17976 AF	GHFS primary house channel
17979 N	RAF channel UR
17982 N	RAF channel IN
17985 N	
17988 CG	RAF channel BJ
17991 CG	
17992 F	USAF Mystic Star
17994 AF	
17995 F	RAF channel DQ
17997 AF	
17999 F	USAF Mystic Star
18000 AF	RAF channel BS
18003 AF	Possible USAF Mystic Star F-532/ USAF ALE Channel- Scope Command
18006 AF	Belgian AF channel YO
18009 AF	RAF channel CM
18010 F	French AF-Citadelle 1
18012 N	
18015 N	
18018 N	RAF channel BE
18019 F	GHFS discrete-Ascension
18021 AF	
18023 F	USAF Mystic Star F-778
18024 AF	RAF channel DT
18027 AF	STRATCOM Zulu 270

Abbreviations used in this column

AF	Air Force	N	Navy
AFB	Air Force Base	NAS	Naval Air Station
AFSOC	Air Force Special Operations Command	NATO	North Atlantic Treaty Organization
AIG	Address Information Group	NOAA	National Oceanographic and Atmospheric Administration
ALE	Automatic Link Establishment	NORAD	North American Aerospace Defense Command
AM	Amplitude Modulation	PACAF	Pacific Air Force
ANDVT	Advanced Narrowband Digital Voice Terminal	Packet	Teleprinter system used by hams for computer to computer comms
ANGB	Air National Guard Base	PNA	Philippine News Agency
ARCN	Airborne Radio Communication Networks	POL-ARQ	Polish diplomatic ARQ teleprinter system
ARQ	Synchronous transmission and automatic repetition teleprinter system	QSOX	Will you listen on (frequency)?
ARQ-E3	Single channel ARQ teleprinter system	RAF	Royal Air Force
ASW	Anti-Submarine Warfare	RAAF	Royal Australian Air Force
AWACS	Airborne Warning and Control System	RNZAF	Royal New Zealand Air Force
CanForce	Canadian Forces	RSA	Republic of South Africa
CG	Coast Guard	RTTY	Radioteletype
CP	Command Post	SAR	Search and Rescue
CW	Continuous wave (Morse code)	SITOR	Simplex teleprinting over radio system
DSN	Defense Switch Network	SITOR-A	Simplex teleprinting over radio system, mode A (ARQ)
EAM	Emergency Action Message	SITOR-B	Simplex teleprinting over radio system, mode B (FEC)
FACSFAC	Fleet Area Control and Surveillance Facility	STRATCOM	Strategic Command (U.S.)
FAF	French Air Force	UHF	Ultra High Frequency
FEMA	Federal Emergency Management Agency	Unid	Unidentified
GAF	German Air Force	U.S.	United States
GHFS	Global HF System	USAF	U.S. Air Force
HF	High Frequency	USCG	U.S. Coast Guard
IAF	Italian Air Force	USN	U.S. Navy
MACS	Military Aeronautical Communications System (Canada)	VFT	Voice Frequency
MARS	Military Affiliate Radio System	WB	Wideband
MFA	Ministry of Foreign Affairs		
MOD	Ministry of Defense		

All transmissions are USB (upper sideband) unless otherwise indicated. All frequencies are in kHz (kilohertz) and all times are UTC (Coordinated Time Universal)

- 2357.5 OUA32-Danish Navy Stevns, Denmark, with CW V marker at 2017. (Ary Boender-Spijkenisse, Netherlands)
- 2553.0 Unid French CW station sending "BT NR 06 S 02 21:50:16 1997 BT" then 5-letter groups at 1952. (Boender-Neth)
- 2643.0 A9M-Hamala Radio, Bahrain, with a CW marker at 2255. (Boender-Neth)
- 2795.0 ESA-Talinn Radio, Estonia, with a CW marker at 2311. (Boender-Neth)
- 2806.0 IGJ41-Italian Navy, Augusta, Italy, with a 100 baud CARB RTTY broadcast at 2312. (Boender-Neth)
- 2815.0 IGJ42-Italian Navy, Augusta, Italy, with a 100 baud CARB RTTY broadcast at 2314. (Boender-Neth)
- 2829.5 SPB-Szczecin Radio, Poland, with a CW marker at 2340. (Boender-Neth)
- 2845.0 PBB-Dutch Navy, Den Haag, Netherlands, with a 75 baud RTTY CARB broadcast at 2317. (Boender-Neth)
- 2846.0 Unid station sending weird distorted CW at 2318. Send üFEAV (... ..) for hours. (Boender-Neth)
- 3143.0 Dandy Dan working Nightwatch 01 at 0311. Powerkit working Nightwatch 01 at 0228. (Jeff Haverlah-Houston, TX)
- 3175.0 V-Russian Navy Khiva single letter HF CW marker at 2156. (Boender-Neth)
- 3196.0 R-Russian Navy single letter HF CW marker Ustinov, Russia, at 2222. Prague Meteo, Czech Republic, with a 50 baud RTTY synopsis broadcast at 2222. (Boender-Neth)
- 3321.0 R-Russian Navy Ustinov single letter HF CW marker at 2156. (Boender-Neth)

- 3388.0 Unid CW station sending 5-figure groups at 2228. (Boender-Neth)
- 3772.0 P-Russian Navy single letter HF CW marker Kaliningrad, Russia, at 2218 transmitted in groups of three P's. (Boender-Neth)
- 4015.0 AE1USA-USAF MARS Heidelberg, Germany, with a 300 baud packet message to AE1UFB at 1804. (Boender-Neth)
- 4018.5 Unid station sending the following in CW at 1:35: "BT NR 19 A 28 21:24:21 1997 BT" plus 5-letter groups. This went on for hours. Very loud signal. (Boender-Neth)
- 4021.0 Unid CW station sending endless 5-figure groups at 2003. (Boender-Neth)
- 4030.0 Unid CW station sending "557 51" and 5-letter groups at 2120. (Boender-Neth)
- 4031.0 P-Russian Navy single letter HF CW marker Kaliningrad, Russia, at 2051 and transmitted in groups of three P's. (Boender-Neth)
- 4040.0 Unid Russian military CW station sending CVV call sign and 10 count. Lousy modulation of an endless tape at 2208. (Boender-Neth)
- 4060.0 Unid French CW station sending "BT NR 06 S 02 21:50:16 1997 BT" then 5-letter groups at 1952. (Boender-Neth)
- 4154.0 DHJ59-German Navy, Wilhelmshaven, Germany, working an unid vessel at 1940. (Boender-Neth)
- 4274.0 GKB2-Portsmouth Radio, England, with a QSOX CW marker tape at 11942. (Boender-Neth)
- 4280.0 PBC-Dutch Navy, Goeree, Netherlands, with a 75 baud CARB RTTY broadcast at 2127. (Boender-Neth)
- 4292.0 IAR-Roma Radio, Italy, with CW weather at 1940. (Boender-Neth)
- 4295.0 HWN-French Navy, Paris, France, with a 75 baud RTTY RY tape for FAAA (any/all French war ships) at 2125. (Boender-Neth)
- 4346.0 9AR-Rijeka Radio, Croatia, with V CW tape at 2027. (Boender-Neth)
- 4470.0 Unid CW station sending "VVV QJR NO QCM QYT6 K" at 2203. (Boender-Neth)
- 4495.0 Nightwatch 01 working Dandy Dan at 0309. Nightwatch 01 worked Powerkit at 0227. At 0401 Log Road working Nightwatch 01 and had this frequency set as primary and 9016 kHz set as secondary. (Haverlah-TX)
- 4547.0 3HU-Unid German (?) military station at 2035. Stations included 3HU, N9P, and D7K with radio checks in English and tactical talks in German. (Boender-Neth)
- 4557.9 R-Russian Navy Ustinov single letter HF CW marker at 2040. P-Russian Navy Kaliningrad single letter HF CW marker at 2146. (Boender-Neth)
- 4558.0 S-Russian Navy, Arkhangelsk single letter HF CW marker at 2146. C-Russian Navy Moscow single letter HF CW marker at 2146. (Boender-Neth)
- 4605.0 P-Russian Navy Kaliningrad single letter HF CW marker at 1700 plus messages in the 36-50 mode. (Boender-Neth)
- 4724.0 Andrews as lead GHFS station with a 20/20/26-character EAMs transmission set over an eight minute period at 0418. (Haverlah-TX)
- 4745.0 Slippery working Nightwatch 01 at 0610. Also heard Slippery calling Wheaties at 0615. (Haverlah-TX)
- 4762.0 XYT-Unid station (Dutch army exercise) with voice and 50 baud encrypted RTTY at 2052. (Boender-Neth)
- 4765.0 RFFP-MOD Paris, France, with 200 baud ARQ-M2 messages to RFFUAFE, RFFUBB, etc at 0720. (Boender-Neth)
- 4791.0 FDE14-FAF Contrexeville, France, with V CW marker at 2210. (Boender-Neth)
- 4798.9 Unid station sending the following in CW at 2240: "VVV 933" plus 5-figure groups. (Boender-Neth)
- 4880.0 ULX2-Israeli Mossad number station at 2200. (Boender-Neth)
- 4943.0 Unid CW Russian (?) Cyrillic letters and figures, no words at 2138. Each character is separated by a space mark. Probably encrypted. (Boender-Neth)
- 4993.0 12-Irish Navy working their Dublin headquarters with 100 baud SITOR-A traffic at 0828. (Boender-Neth)
- 5164.5 Prefecture, Epinal, France, using 100 baud SITOR-A sign off at 0708. (Boender-Neth)
- 5215.0 German 5-letter number station at 2202. Ended with "000 000 ende". (Boender-Neth)
- 5268.0 HEP5-Kantonspolizei, Zurich, Switzerland, with a V CW marker at 2020. (Boender-Neth)
- 5616.0 Gander Aeradio, Newfoundland, Canada, working many aircraft at 223. (Boender-Neth)
- 5705.0 Nightwatch 01 working Upper-cut at 1529 and moved to Zulu 211 (12070 kHz). (Haverlah-TX)
- 5711.0 King 81 working Moffett Rescue at 2345. (Jones-CA)
- 5752.0 HBD20-MFA Berne, Switzerland, with 100 baud SITOR-A message to various embassies at 1413. (Boender-Neth)

5757.0 HBD20-MFA Berne, Switzerland, with 100 baud SITOR-A message to various embassies at 1353. HBD77-Swiss Embassy, Brussels, Belgium, with 100 baud SITOR-A traffic to MFA Geneva at 1610. (Boender-Neth)

5800.0 Firebrick calling Nightwatch 01 here at 0630. (Haverlah-TX)

6691.0 Log Road working Andy Gump at 0356. (Haverlah-TX)

6715.0 Firebrick calling Nightwatch 01 at 0629. Eventually raising same at 0629. (Haverlah-TX)

6739.0 Dark 42 working Dark 41 at 0637. Periodic air-to-air comms between the two aircraft. Andrews s lead GHFS station broadcasting a 31-character variable EAM "For Brick" at 1134. (Haverlah-TX)

6757.0 Nightwatch 01 working Bluestone at 0322. At 0339 Nightwatch 01 worked Bluestone again and acknowledged traffic over what sounded like the "bay low freq." (Haverlah-TX)

6815.6 O5K working OV6 at 1210. "Position 140 degrees, ____ nautical miles from us." (Harry Riddell-Rochester, NY via e-mail) *This is U.S. Coast Guard tactical frequency 3C11. You normally only hear ANDVT comms and no clear voice. Nice intercept-Larry.*

6888.0 P1Q working SJG at 1300 with mention of alligators. Also Molson 67 working GX. (Riddell-NY)

6992.5 MFM38-Royal Navy Sea Cadet Corps at 1010 working MFJ22, MFJ04, MFM01, and MFK62. (Boender-Neth)

7485.0 Spanish female 5-digit number station in AM at 0316. Gone at 0345 UT. (Sue Wilden-Indianapolis, IN)

7672.0 FD18-FAF Nice, France, with a CW marker at 1722. (Boender-Neth)

7831.0 Uppercut working Nightwatch 01 at 1813. At 0429, Nightwatch broadcast a 26- character EAM. (Haverlah-TX)

7865.0 SPW-Warsaw Radio, Poland, with phone patch traffic at 1718. (Boender-Neth)

8026.0 Nightwatch 01 working Andrews with data traffic at 0300. SAM 375 working Andrews at 2008. (Jeff Jones-CA)

8032.0 SAM 202 working Andrews VIP for phone patch traffic at 0040. (Jones-CA)

8042.0 Unid stations, traffic extremely weak and completely unreadable at 2016. See 11214 kHz entry. (Jones-CA)

8063.0 Dixie 1 calling Cape Radio at 1300. (Riddell-NY) *Harry, this is the first report I have seen on this frequency for Cape Radio. Must be a new assignment-Larry.*

8143.0 CIA numbers station with test count and 5-digit groups at 1108. (Boender-Neth)

8150.0 PBB-Navy, Den Halder, Netherlands, with 75 baud RTTY CARB broadcast at 1416. (Boender-Neth)

8151.0 IGJ44-Italian Navy, Augusta, Italy, with a 100 baud RTTY CARB broadcast at 1644. (Boender-Neth)

8192.0 9MR-Malaysian Navy Johor Baharu, Malaysia, at 1646 with a 50 baud RTTY transmission: "9MR 5/11 RMMJ MRB MRB RYRYRYRY SGSGSGSG." (Boender-Neth)

8493.0 Royal Navy station, United Kingdom, with 100 baud encrypted RTTY at 1422. (Boender-Neth)

8572.0 CLA-Havana Radio, Cuba, with CW marker at 1743. (Wilden-IN)

8584.0 WCC-Chatham Radio, MA, with CW marker at 1745. (Wilden-IN)

8598.0 OXZ4-Lyngby Radio, Denmark, with a CW traffic list at 1424. (Boender-Neth)

8624.0 FUM- French naval radio, Papeete, Tahiti, Society Islands, with RTTY test transmission at 0443. (Wilden-IN)

8700.0 9AR-Rijeka Radio, Croatia, with a CW marker at 1427. (Boender-Neth)

8906.0 Matai 62 working Gander Aeradio, Newfoundland, Canada. Matai 62 splitting off from Matai 61 flight at 1315. (Riddell-NY)

8942.0 Hong Kong Aeradio working unid aircraft at 1210. (Riddell-NY)

9016.0 Nightwatch 01 working Quantity and Backfield at 0559. At 0602, Firebrick called and raised Nightwatch 01. At 0602 Genetic worked Firebrick and moved to Zulu 150 (5800 kHz). At 0624 Spotless called Nightwatch 02, but eventually worked Nightwatch 01. At 1224, an unid weak station passed a 95-character EAM. (Haverlah-TX)

9017.0 SAM 202 working Andrews with phone patch to SAM command at 0125. (Haverlah-TX)

9022.0 3 Alpha (Royal Australian Air Force Sydney) working 39 at 0624. (Jones-CA)

9037.0 U.S. Navy FT net with mentions of alligators and tracks at 1210. Accents other than American English. Active several days in a row. (Riddell-NY)

9057.0 Nightwatch 01 working various aircraft callsigns at 1711. Most stations weak and didn't catch callsigns. (Haverlah-TX)

10100.9 DDH7-Hamburg Meteo, Germany, with a 50 baud RTTY aero weather reports for European airports at 1720. Parallel to 4583/7646 kHz. (Robert Hall-Capetown, South Africa)

10204.0 Milkweed working Nightwatch 01 at 2037 and entering the net. (Haverlah-TX)

10494.0 RFTJ-French Forces, Dakar, Senegal, with a 48 baud ARQ-E3 Code de Voie transmissions at 0630. (Hall-RSA)

10551.3 GFL23-Bracknell Meteo, England, with 75 baud RTTY synopsis broadcast at 0920. (Boender-Neth)

10586.0 SAM 202 checking Andrews here for new primary at 0110. (Jones-CA)

10798.5 RFLI-French Forces, Fort de France, Martinique, with a 192 baud ARQ-E3 idling signals at 0635. (Hall-RSA)

10917.8 Marine Sirpa, Paris, France, with 48 baud ARQ-E3 French news bulletins at 0705. (Hall-RSA)

10917.9 RFTJ-French Forces, Dakar, Senegal, with a 48 baud idling ARQ-E3 signal at 0640. (Hall-RSA)

10918.4 RFFIC-Marine Dipermil, Paris, France, with 48 baud ARQ-E3 traffic in French at 1700 to RFTJ and AIG 2133. Long naval admin circular. (Hall-RSA)

11153.0 SAM 375 with brief test count at 0132. (Jones-CA)

11175.0 Nightwatch 01 worked Hickam and requested a phonepatch at 0442. Moved to 11181.0. (Haverlah-TX) Reach 89 (tail number 47321) working Offutt GHFS at 2014. Reported trouble with de-icer system. Asked for repair parts. After several phone calls was advised that specialist would meet Reach 89 at Milwaukee with requested parts. (Lloyd Prevatte-La Porte, TX)

11181.0 Nightwatch 01 worked Hickam with attempted phonepatch to two DSN 271 numbers (no answer at either) and to DSN 939 1850 (successful). Brief hi 'n bye connectivity check (and a pointed remark to check the status of the two DSN 271 numbers). (Haverlah-TX)

11214.0 SAM 27000 working Andrews VIP and moving to Mystic Star F-003 (nothing heard on 8036 kHz-F003) at 2014. (Jones-CA)

11220.0 SAM 202 checking Andrews here for new primary at 0105. (Jones-CA)

11244.0 Offutt GHFS with a 75-character EAM at 1919. (Haverlah-TX)

11248.0 Royal Australian Air Force Sydney calling 484 with no reply (no joy) at 0635. (Haverlah-TX)

11413.0 SAM 375 working Andrews VIP for phone patch to SAM command at 0025. (Jones-CA)

11460.0 PACAF 01 working Andrews VIP with phone patches at 0148. (Jones-CA)

12070.0 Uppercut called and worked Nightwatch 01 at 1811. (Haverlah-TX)

12695.0 KLB-Seattle Radio, WA, with CW wheel and traffic list at 1851. (Wilden-IN)

12727.5 LGJ-Rogaland Radio, Norway, with CW marker at 1438. (Boender-Neth)

12856.0 XSG-Shanghai Radio, China, with a CW marker at 1444. (Boender-Neth)

12939.0 LZW53-Varna Radio, Bulgaria, with a CW marker at 1451. (Boender-Neth)

13054.0 UIW-Kaliningrad Radio, Russia, working an unid vessel at 1447. (Boender-Neth)

13200.0 Andersen GHFS with a 120-character EAM at 0545 trailing most of the GHFS broadcasts of the same at 0538. (Haverlah-TX)

13217.0 SAM 201 working Andrews VIP at 2256. (Jones-CA)

13248.0 SAM 27000 working Andrews VIP and SAM 26000 with signal checks at 1924. (Jones-CA)

13415.3 PCW1-MFA, Den Haag, Netherlands, with a CW marker at 0923. (Boender-Neth)

13960.0 Unid SAM flight working Andrews VIP with phone patch traffic at 1630. (Jones-CA)

14670.0 CHU-Canadian time and frequency standard station, Ottawa, PQ Canada, with AM ID at 1555. (Wilden-IN)

16797.1 TSM *Berzinski* at 1035 with a 50 baud RTTY message on the fish catch to Klaipeda. (Hall-RSA)

16798.1 PNA, Manila, Philippines, with a SITOR-B English news bulletin at 1630. (Hall-RSA)

16800.1 UBDC-MA1810 with crew telegrams to Murmansk using 50 baud RTTY at 1020. (Hall-RSA)

16807.2 EM REOC BOY (Navrotas) with 1030 SITOR-B news bulletins in English (looked like a PNA relay). (Hall-RSA)

17055.5 MGJ-Royal Navy, Faslane, England, with 75 baud RTTY channel status message at 1628. (Hall-RSA)

17972.0 SAM 27000 working Andrews VIP with phone patch traffic to SAM command, and SAM 26000 with signal checks at 1914. (Jones-CA)

18064.2 SNN299-MFA, Warsaw, Poland, with 100 baud POL-ARQ Polish news bulletins at 1558. (Hall-RSA)

18321.1 RFTJ-French Forces, Dakar, Senegal, at 1000 with 192 baud ARQ-E3 French sports news bulletins. (Hall-RSA)

18380.2 Paris, France at 1615 with 100 baud ARQ-E3 transmission. Seven pages of 5- letter groups to RUEONCA 0358 (NATO callsign?). (Hall-RSA)

18380.5 Paris, France at 1025 with 100 baud ARQ-E3 transmission of coded numerals with "execute operation" to RFVI-Le Port, Reunion Island. (Hall-RSA)

Nigeria Hit By More Opposition Radio

Radio Nigeria was heard by BBC Monitoring to say that equipment was being installed to block (i.e. jam) Radio Kudirat, which is the first of the current crop of anti-government radios, but what about the next two, Voice of Free Nigeria and Radio NADECO?

And the fourth, which Ivan Grishin, Ontario, discovered in mid-September UT Sunday only at 0100-0130 on 5910 via Germany on its North American beam, immediately following the Vilnius relay until 0129? We heard it the following week: it's Radio New Nigeria, Voice of the Nigerian Advocacy Group for

Democracy and Human Rights, P.O. Box 202, Boston, MA 02131, or nagdr@aol.com. This included speeches in American-accented English, Efik, and Yoruba, "another Mo-Jo production." We suspect there are other airings actually aimed at Nigeria.

We add our sadness to that expressed by so many at the death of Arthur Cushen on Sept. 20, one of the world's best-known shortwave personalities, who was making his name already during World War II before we were born, and continued to be heard on the air almost until the end.

ALASKA KNLS English at 0800-0900 for winter is on 6150 ex-9615; at 1300-1400 still 7365 (Arthur Cushen, RNZI Mailbox)

ANDAMAN ISLANDS AIR, 4760.0, 1112-1131 around equinox with 1130 ID as Akashvani Port Blair (Art Delibert, MD, *Cumbre DX*)

ARGENTINA RAE changed lots of language times on Oct. 1, including English to Europe at 1800-1900 instead of 1900, on 15345 M-F, but to NAM still 0200-0300 on 11710 Tue-Sat (Gabriel Iván Barrera via Harold Sellers via Ivan Grishin) Presumably when local DST started, rather than making schedule changes according to listeners' time (gh)

Another FM station getting a relay on SSB is Feeling FM 100.7, Buenos Aires, heard on 8098-LSB from 2040 to 2230 fade and at 1020-1040* But a few days later at 1020-1200 fade, 8098-LSB was carrying LR5, La Red, and another few days later it was LS5, R. Rivadavia at 0900-1022* (Takayuki Inoue N., *Relámpago DX*) R. Rivadavia on 8098-LSB at 0135-0200+ soccer, also at 0520-0600+ music (Brian Alexander, PA) 11132.8v-USB R. Rivadavia at 1830-1900 football; LSB had Aspen 102, FM in Buenos Aires at 0043 (Norberto Pugliese, Argentina, *BC-DX*)

AUSTRALIA Monash University is working on a deal with R. Australia to broadcast educational programs in English and other languages on SW to Asia. This may lead to reactivation of the Darwin transmitters, or leasing Asian transmitters (Guy Healy, *The Weekend Australian* via Matt Francis, *World of Radio*) After complaints from listeners, RA adjusted its antenna on 9580 to restore good strength in NAM (RA Feedback via BBCM) Had been 30°, now probably back to 70° or so. Having to relay National Radio after 1205 is not necessarily bad; just wish RA would publish the exact program schedule. Some interesting music shows at 1205, such as on Fri *Sound Quality* and on Sun *Other Worlds* (gh, *Review of International Broadcasting*)

Bob Padula, of *Electronic DX Press* was injured in a car accident a few weeks before retiring from his job in Sept, but plans to visit Europe, North and South America in January (gh) My *EDXP Report* has been added to HCJB's *DX Partyline* monthly from Sept 27 (Padula)

AUSTRIA ORF changed server so new website: <http://www.orf.at/~roi/> and new E-mail such as roi.service@orf.at (Joe Hanlon, PA) In Sept, 9655 including English at 0030 and 0230 was hit by co-channel from Portugal //9570; we urged ORF to defend its frequency (gh)

AZERBAIJAN V. of Justice is a new independent radio station at Stepanakert, brainchild of Karabakh journalists, to establish a dialogue between Armenians and Azerbaijanis; Tue, Thu 1500, repeated Wed, Fri 0600 on 9677 (Armenpress via BBCM) 9677.4v, 1500-1540 with info program in local language mentioning Azerbaijan; modulation at times seemed to revert to jamming sound (Harald Kuhl, Germany, *DX Window*) 9677.2v, *1503-1537*, strong but difficult to read (Harald Kuhl, Germany, *DSWCI DX Window*) Probably Stepanakert on 9677.5v between Moscow and Manila 1510-1535*, poor audio (Noël Green, UK, *BC-DX*) One hour later now?

BELGIUM RVI starts using relays for W97, such as RN-Bonaire but only in Dutch to NAM at 2300-2330, 0430-0500, and 2300-2330 on

9555, 0430-0500 on 6120, 1200-1230 to SAM on 15120; Madagascar 1000 to SAF; Tashkent to SEAs, Pet-Kam to Indo/AU/NZ at 1200;

All times UTC; All frequencies kHz; * before hr = sign on, * after hr = sign off; // = parallel program-ming; + = continuing but not monitored; 2 x freq = 2nd harmonic; J-97=May-Sept; Z-97=Summer season; W-97=Winter season; [non] = Broadcast to or for the listed country, but not necessarily originating there.

three times a day from Jülich, Germany to C&EEu (RVI *Golfids* via *BC-DX*, Guido Schotmans, *DSWCI DX Window*) Spanish and Arabic dropped; no more evening to NAM in English, just morning without relay at 1300 on 13680 (RVI *Radio World* via Edwin Southwell, Ivan Grishin, Joe Hanlon) Perhaps means 1400 for standard time? Failing to put English on Bonaire is a slap in the face to non-Flemish would-be listeners (gh)

BOLIVIA R. Carlos Palenque, *la voz de los sin voz*, almost daily near 6195 around 0900 but heavy BBC QRM from 0914, wiped out at 0942 when Antigua comes on; replaces R. Metropolitana (Fernando Vilorio, Venezuela, *World of Radio*)

BRUNEI Further checks with RTV Brunei indicate there are no plans for returning to SW and no SW transmitters have been ordered (Hans Johnson, *Cumbre DX*)

CANADA RCI got word in mid-August that funding had been found to assure it would continue beyond next April, over \$15 million a year (RCI newscast) From Foreign Affairs and Heritage, not CBC, but RCI continues to be managed by CBC and RCI employees are CBC employees; RCI becomes an element in the government's information strategy, but retains its editorial independence. Some languages may be revived (Bob O'Reilly, RCI Executive Director on VOA *Communications World*)



RCI was obliged to reorganize programming in Sept as CBC began its new season. We've switched the times following to one hour later for standard time from Oct 26, but there could be further unexpected changes.

This Morning, Sunday Edition continues to be a lot like the old *Sunday Morning* even including the Audio Files quiz and pieces by Ian Brown, 1400-1700. New at Sun 2330-0100 Mon is *Sound Advice* with new classical CDs. *Tapestry* moved to Mon 0305-0400. With the demise of *Double Exposure* and *Royal Canadian Air Farce*, *The Great Eastern* got to be on SW, purportedly from the Broadcasting Corp. of Newfoundland on 520 kHz, UT Sun 0305—also on Northern 9625 Sat 1630. *Madly Off in All Directions* is the other comedy show, Sat 2205, Sun 0330, Mon 1333. *This Morning Tonight* compresses the three-hour show into less than one hour at 0205 Tue-Sat and 1405 Mon-Fri (*Review of International Broadcasting*)

CIOC is aware that CFCX 6005 SW is off the air, but will not make a special trip to the site to fix it until the AM transmitter needs attention (Sheldon Harvey via Bill Westenhaver via Rich Hankison, *Cumbre DX*)

CHAD RNT on 6165 at 2150-2201*, clear after CRI/Switzerland 2157*, s/off, ID in French, anthem verified at <http://www.abcnews.com/reference/countries/Miss->ing from 4904.5 but back there the next day (Jay Novello, NC)

CHILE The FM band is full in Santiago, so new station uses 49.3 MHz, Asociación Gremial(?) Metropolitana de Transporte, info and music for users of public transport, from studios at R. Minería (Gabriel Iván Barrera, RN *Radio-Enlace*)

CHINA A powerful transmitter [sic] for CRI external came into use at Urumqi in Xinjiang

Aug 29. China now ranks among the advanced countries with a world-class transmitter for overseas broadcasts (CPBS via BBCM) In the 1600/2400 period some new frequencies believed to be Urumchi are 9900, 9725, 9720, 9670, 9635, 9585, 7255, 7250, 7175 (*PaniView* via *BC-DX*) Olle Alm from Sweden has been investigating the SW scene from China and concludes that the Continental transmitters are



now coming on the air from Uchumi near Urumchi (Ludo Maes via Wolfgang Büschel) *Continentalers are American-made. No details whatsoever about how many, times, or frequencies (gh)* This freed old SW transmitters to be used for jamming (Büschel) China finally began jamming R. Free Asia in Mandarin in mid-August, some 10.5 months after it started; the State Department condemned the jamming in the usual terms (Chicago *Tribune* via Mike Cooper) Since mid-August, DXers worldwide such as Padula, Green, and Goonetilleke have noted more SW channels from CRI with superb powerful signal and clear audio (BC-DX) Strong Chinese station mentioning Shanghai on 6157 jamming Singapore on 6155 from 0815 with terrible overmodulated audio (Roland Schulze, Philippines, BC-DX)

COLOMBIA La Voz de los Centauros, 5955, with new morning broadcast until 1300*, in addition to weekday-only 2100-2300; chronic overmodulation for two years is now OK (Henrik Klemetz, *Dateline Bogotá* via DSWCI DX Window)

An unidentified perhaps parish station only with mass, religious music, and prayers, heard on 6201.2 at 2330-0035, sometimes as late as 0345, with a strong signal in Bogotá; may be 4 x 1550 (Rafael Rodríguez R., Colombia) 6201.1, 2330-0100 daily but not in morning, no IDs, seems to be harmonic from Granada, Antioquia (Henrik Klemetz, *op. cit.*)

COSTA RICA *Continent of Media* resumes after summer hiatus on RFPI only, monthly supplement to *World of Radio* about media in America, not especially SW, on new schedule: Wed 2300 on 15050, 7385; Thu 0700 on 7385, 7585. Each program is repeated successive weeks until a new edition arrive (gh, RFPI) Due to continuing jamming of 7385, RFPI upgraded //7585 to 10 kW on AM in the 0000-1200 period, and was looking for a new frequency to carry the 2 kW USB unit; in the daytime, perhaps bringing back 21465 (gh)

R. 88 Estereo is not likely to show up on 6075 soon; the FM concession was granted ahead of a hundred others waiting in line as a political favor, and has been hotly opposed. If a profitable FM does not exist, the SW would not either. Complicating matters is the fact that RFPI already uses 88.3, and plans to increase power and coverage (James Latham, RFPI)

CUBA [non] La Voz del CID appears to be having serious technical and/or political problems with their clandestine transmission site; have approached other stations about buying airtime (Jeff White, DSWCI DX Window)

DOMINICAN REPUBLIC Onda Musical on new frequency 4788.05 at 0210, wobbling up to 4788.43 just before 0232* (Jay Novello, NC, *World of Radio*)

ECUADOR Still troubled by interference on 9765, HCJB moved its 0730-0930 for Europe to 9365 (Finbarr O'Driscoll, Ireland; Edwin Southwell, England) It seems HCJB and friends have realized they're not going to convert the "World by 2000" but evangelism will continue into the 21st century, so the joint mission is renamed "World by Radio" (gh, info from *European Update* via Gigi Lytle) See also AUSTRALIA

GABON FBIS says "V. of Gabon" has new 100 kW transmitter thanks to French aid; beautiful signal, never so strong before on 4777 at 0515 (Gregg Calkin, Canada, *NU* via BC-DX)

GEORGIA [non?] A clandestine on 7050 in August at 1920 in Georgian, also ID in Russian as *Svobodnaya Gruzia* or Free Georgia; interval signal was a popular Georgian song *Suliko*. Fair signal in European Russia (VOR *Klub DX* via Nikolay Pashkevich, DSWCI DX Window)

GREECE VOG via VOA-USA at 1830-2000 on 11730, 17745, changed program feed from multi-lingual to Greek-only including a worldwide call-in at 2100 (John Babbis & Owen Williamson, *Review of International Broadcasting*) Sometimes VOA starts 11730 with big-band fill music as early as 1800, past 1830 (gh)

GUYANA GBC, 3290, with VOA relay on and off around 0130, 0400, 0600, with VOA Express IDs mixed with local programming (Brian Alexander, PA, *World of Radio*)

HAWAII KWHR's initial test schedule for second transmitter in early Sept kept clashing with fellow religionists such as KTNB on 7510, WYFR on 17555. At one point it became: 0700-1300 on 11565, 1300-1500 on 7560, 1500-1900 on 7510, 1900-0700 on 17555. After first week, started relaying their local Pulse-FM from South Bend (gh) The new transmitter was tested previously on the schedule of the old transmitter, so it wasn't really first used on the above (George Thurman, TX, *World of Radio*)

HONDURAS HRET reactivated on 4959.0, 0104-0205* in Miskito, Spanish, 0203 ID (Terry Krueger, FL, DSWCI DX Window)

INDIA AIR news in English at 1530 observed on all these regional frequencies: 3223, 3315, 3390, 3945, 4760, 4775, 4990. Several others continued in Hindi (Mahendra Vaghjee, Mauritius, *Cumbre DX*)

INTERNATIONAL WATERS [non] Scott Becker was interviewed by Bill Bragg on the Yesterday USA network, which has been promised a free 24h SW frequency from the *Electra* radioship. Said the ship was at a dock in East Boston where *Fury* and *Sarah* had been, with a new coat of purple and white paint, and about ready to sail for the Caribbean once a few more parts were received (via Tom Dimeo, *World of Radio*) One tower is visible supporting an inverted-V antenna. It's an old harbor tug. We are monitoring it and may take action if there is any transmission from it here (Vincent Kajunski, FCC Boston, *World of Radio*) Questionable whether it would be seaworthy for a voyage to Caribbean; and Al Weiner's creditors were closing in to prevent it ever sailing (gh)

IRAQ As of late August, Iraqi SW frequencies included: Republic of Iraq Radio, main

domestic service in Arabic, on 11785v at 0900-1200, 11292 and 9755 at 1900-2300, 9715 at 1400-1600. V. of the Masses, 9715 at 0615-0900; Mother of Battles Radio, 9715 at 1600-1900 (BBCM) RII retimed French and English in early Sept to two hours earlier, 2000-2100 on 11785v, poor modulation (Nikolay Pashkevich, Russia, *Cumbre DX*) Also had English for a while around 0300-0400 on 11787, not 11785 (Randy Stewart, MO, gh)

IRELAND [non] RTE may have special SW broadcasts with presidential election returns Oct. 30 (Finbarr O'Driscoll, Ireland)

West Coast Radio Ireland, via Germany, for S-97 UT Thu 0100-0200 to NAM, on 5910 ex-9875 (Finbarr O'Driscoll, Edwin Southwell) Same bad choice as last winter, due to big utility on 5907.5 (gh)

ISRAEL DST ended here Sept 15, when Kol Israel schedule shifted one UT hour later, with English at 0500, 1500, 2000 (Joël Rubin, CA)

LAOS LNR, Houa Phan on new 4690.9 ex-4660, *0955-1100* with hill tribe music, native singing, not to be confused with nearby Vietnamese regionals (Roland Schulze, Philippines, BC-DX) Very weak, but should be possible on East Coast in morning, and December in evening (Dave Valko, PA, BC-DX)

LIBYA 1000 Hz test tones at 0730-1015 on 7120, 9655, 11770 (Wolfgang Büschel, Germany, BC-DX)

LEBANON A short-circuit caused a fire destroying one of the SW transmitters of V. of Hope (Gary Hull, VOH via *Cumbre DX*)

LIBERIA Star Radio planned to add SW in Oct on 5890 in daytime, 3400 at night; on FM at 0500-2000, it had Liberian English news daily at 0615, 0715, 1815, 1915; and in regular English at 0630, 0730, 0757, 1830, 1930, 1957 (BBC Monitoring)

MADAGASCAR Sept. sked from R. Nationale Malagasy shows some new frequencies: 0300-0500 3140 replacing 3288, and 5010; 0600-1600 5010, 6135, 7150—actually heard on 7155, and 9690; 1600-2000 3140, 5010 (Mahendra Vaghjee, Mauritius, *hard-core-dx*) 3140 confirmed //5009, weak and full of static from fade in around 1510 (Victor Goonetilleke, Sri Lanka, UADX via BC-DX)

MALI Absence of CRI relays may be temporary while they install new transmitters here as they have in China (Wolfgang Büschel, Germany) In late August, schedule announcements even dropped the Mali times and frequencies to NAM, 0000 & 0300 on 9710, 11695 (gh)

MEXICO R. Educación's power increase is only to 10 kW, not 50. *Comunicaciones 6185*, the new DX program, actually was appearing one UT hour earlier than given last month due to DST but from Oct. 26 should really be at those times (Héctor García B., *World of Radio*)

The Mérida, Yucatán station on 6105, reactivated at 1300-1330 with tropical music from its FM station Candela FM, and with news before 1300 (Héctor García, México DF) Also heard here in the 1200 hour with news, clearer modulation than before but somewhat low (gh) 6105 outlet is supposed to be simulcasting MW 810 which is no longer Tus Panteras but R. Fórmula Mérida (Julian Santiago, México) Already in June, had Candela FM ID (Jay Novello, NC)

R. Mil may be running some separate SW programming on 6010 including a DX program instead of 100% simulcast of MW 1000 (Santiago via García)

XERTA, 4800.7, was not heard in the month following mid-August (gh) It was awaiting more parts; transmitter is on Cerro del Ajoco (Héctor García) Came back for another test one night only, UT Sept 19 (Jay Novello, NC)

XERMX plans to add a new 10 kW transmitter and antenna in November which may be rotated to different target areas Eu, NAM, SAM; listeners are invited to say at what hours they would like to listen (XERMX Mail Box) Probably with new frequency too such as 11770 or 15430 (gh)



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MOZAMBIQUE R. Moz. Maputo, 5894.9 at 2115 music and phone call in Portuguese, weak and heavy noise (Mahendra Vaghjee, Mauritius, DSWCI DX Window)

NEPAL R. Nepal on 7164.42, 0012-0016 in late August at sign-on //5005.04 (David M. Clark, Ont.)

NETHERLANDS ANTILLES One of the RN Bonaire transmitters will conduct digital tests by yearend (R. Netherlands Media Network) see also BELGIUM

NEW ZEALAND RNZI had trouble bringing up its 6100 frequency, so extended 9795 as late as 1130 (gh, OK)

NORWAY The student-run special station in the far northern city of Trondheim, UKE-Senderen is active every two years including this year, 24 hours until Nov. 12 with about 300 watts to a 2-element rotatable yagi atop a 13-story building on 7215.1. Please send reports to: Akademisk radioklubb Studentersamfundet, N-7030 Trondheim (Willi Passmann, hard-core-dx)

PAKISTAN R. Pakistan S97 changes include English 1600-1630 on 6070, 7485, 9515, 9600, 11565 (Noël Green, UK, BC-DX)

PERU R. Comas Televisión, Lima, is a new station on 3250.8, heard at 0320-0500* to return at 1000. Comas is a district in Lima; played cumbias, but no comunicados or ads (Rafael Rodríguez, Colombia) Also at 1000-1030 campo music, 1030 echo ID (Hans Johnson, ID, Cumbre DX)

R. Cristal is new on 7746 at 0151, town sounds like Sangayau (Horacio Nigro, Uruguay) 7745.9 is at San Hilarión district, San Martín province and region; s/on varies 2330/0045, s/off around 0300 announced, but heard as early as 2130 (Henrik Klemetz, Dateline Bogotá via DSWCI DX Window)

Ondas del Río Mayo on about 6810.5 ex-6797 until 0205* and at 1045 (Horacio Nigro, Uruguay, World of Radio) Must be the lively *madrugador* show with UT-5 time checks I had the same morning around 1030 on 6811.3 (gh, OK)

R. Chaski, nominal 6090, deliberately tries for 6087.5 with crystal to avoid interference, but trying to get reassigned to 6070. On the air since July 1 with 1 kW, hopes to increase to 5 next year; dipole antenna between two towers, hoped to upgrade by yearend. Address is Apartado 368, Cusco. Studios are at First Baptist Church, downtown (Dan Muth, R. Chaski on HCJB DX Partyline)

Acquaint yourself with the Quechua language with a 12-minute news feed intended for radio stations by E-mail, *Nuqanchik* which means we or us; also on website <http://ekeko.rcp.net.pe> (DevMedia via Don Moore)

PORTUGAL R. Portugal at São Gabriel has one 300 kW transmitter mainly for Africa and Timor; seven 100 kW of three different brands. Most antennas are rhombics, and a few curtains. RFE/RL no longer broadcasts from Portugal. Maxoqueira and Glória sites are both being dismantled. From Maxoqueira, six 500 kW are being shipped to Timian; antennas were to be down by end of August. Glória had two 50 kW, and nineteen 250 kW. Four of the latter can be disposed of by the mayor of the city. Five will be moved to Playa de Pals, Spain and two to Kavalla, Greece; five have been donated to government of Greece, probably three for Avlis and two for Thessaloniki. Remaining three are going to Iranawila, Sri Lanka. R. Renascença's SW transmitter at Muge has been off since Dec 1996; repairs on the way but not certain if will resume. R. Trans Europe, Sines is using all three 250 kW for DW, RCI, R. Portugal, with two fixed curtain arrays, one fixed log-periodic and two rotatable curtain arrays which are really impressive. There is a Radio Museum in Lisbon at Rua do Quelhas 21, really worth a visit—photos of the history of Portuguese broadcasting, impressive collection of antique radio sets, library which is unique (Ludo Maes, Transmitter Documentation Project) That address used to be the offices of R. Portugal's external service, when I visited (gh)

RUSSIA V. of Russia made seasonal frequency changes in early Sept.; there may be more in Oct. or Nov. but try these in English: 1900-2100 on 9810; 2100-2200 on 7360, 7370; 2130-0100 on 5940 (Ivan Grishin, Ont., World of Radio)

Evenki Autonomous Area has local programs in Russian, Evenki, from Tura daily at 0000-0100, 0400-0415 on 4040 (VOR DX Klub via BBCM) One hour later for winter.

SA'UDI ARABIA A few years ago I was in Sa'udi Arabia and listened to SW a lot. R. Baghdad and R. Tehran were consistently and very strongly jammed by Sa'udi Arabia (Harold Muller, amfmdtvd)

SLOVAKIA RSI announces they plan to close the Velke Kostolany station quite soon, transfer programming to Rimavská Sobota. This may impact AWR usage of two R.S. transmitters and part-time on another (Adrian Peterson, AWR, DSWCI DX Window)

SOLOMON ISLANDS SIBC, 5020 is on at 1900-1130 without any breaks; 9545 has been off since Nov 1995. They have been unable to obtain parts for the 30-year-old transmitter so cannibalize it to keep 5020 going. Hope to get a new one for 9545 in 1998 (Hans Johnson, Cumbre DX)

SOUTH AFRICA After 3 months on air, World Music Radio had not sold a single commercial. DXers were more interested in QSLs than in supporting us by buying a T-shirt. So we have to leave the scene to state-run and religious stations which seem to have no problems with money. There is a very slim chance that WMR will return on 1 November. The last broadcast on 3345, 6290 was Aug 24 until 2200* (Stig Hartvig Nielsen, WMR, DSWCI DX Window)

SRI LANKA [non] SLBC started weekly European service Sat 1900-2000 on 5975 via BBC Skelton; in exchange, BBC programs are being broadcast in SL (BBCM) Loud and clear, but mostly boring talk, not lots of fascinating Asian music which could be heard from SLBC 11800 in the 1970s (Wolfgang Büschel, Germany, BC-DX)

SWITZERLAND SRI is cancelling its broadcasts in Portuguese on SW at the end of October, moving on to a "new phase" of placement by satellite (via Valter Aguiar, radioescutas) They tried to put a positive spin on it, but Brazilian listeners expect local stations will not carry much, just as happened with VOA and DW (gh)

SYRIA Syrian Arab Republic Radio, Main Program in Arabic on SW: 0600-1700 as expected for winter time starting Oct 1, on 13610, 12085; includes *Voice of the Armed Forces* Sat-Thu 1530-1600 (BBCM) Same two have English 2005-2100, 2100-2155; 12085 stronger on the first, 13610 on the second (Lee Silvi, OH, Cumbre DX)

TAIWAN V. of Free China announced it would change name from Jan 1 to Taipei Radio International (Yamada & Yamashita, DSWCI DX Window) A grand political move (Finn Krone, DXW editor)

TIBET [non] V. of Tibet clandestine at 1225-1255 on 11570 was finally covered by Chinese jamming in mid-Sept, with CNR-1 program; but R. Free Asia on nearby frequencies was not jammed (G. Victor A. Goonetilleke, Sri Lanka, UADX via BC-DX)

TURKEY VOT 9655 at 2200-2250 in English put strong spur around 9896, but none on 9413v (Wolfgang Büschel, Germany, BC-DX)

UK OGBANI A scare spread through the SW community with a report that the BBC World Service was about to accept advertising; later it was clarified that an agency was looking into getting a cut of advertising adjacent to BBC segments carried on local stations around the world, not on the SW feed (gh)

USA The late John Chancellor, once a VOA director, was honored with a TV studio dedicated in his name (Washington Post via Mike Cooper) VOA has been running underwriting announcements for over a year. They generally are barter arrangements rather than in return for payment or contributions. They are still not very common on VOA (Kim Elliott, VOA, Cumbre DX) For winter, the only Greenville frequency at 1700-1800 including *Communications World* Sat 1730, moves from 15135 to 15120 (Kim Elliott, VOA CW)

WWCR's *Ham Radio & More* repeat Tue 0800 [winter 0900] moved from 3210 to 5070; same for *Spectrum* on Mon; *View from Europe* Sat 0630 [0730] on 3210 after *World of Radio* (Adam Lock, WWCR) *Spiritual Awakening* retimed to M-F 1315-1320 [1415-1420] on 15685 (James Bean, ME)

WRMI, 9955, from Sept scheduled *Viva Miami* weekdays at 2200-2230, often pre-empted for DX/pirate specials, such as Oct 30, *Mermelada por la Pavada*, a feature produced by Argentine children, with special QSL from C.C. 950, 2000 Rosario (WRMI)

WRNO observed intermittently back on 15420 in the daytime in Aug, Sept (Wolfgang Büschel and gh) Joe Costello's estate is being contested by the family and Loyola University. Meanwhile WRNO is being run by co-executors Ashton Hardy and Joe's brother Michael (Hans Johnson, Cumbre DX)

WMLK, 9465, is building a 100 kW transmitter; winter sked is 0400-0900, 1700-2200 exc Sat (Hans Johnson, Cumbre DX)

FCC website, which may not be kept up to date, says nothing about an application from Chuck Harder for SW in Florida, as reported last month (Benn Kobb; Harry Helms, www.DXing.com)

Sunset Triple Drive-In, Colchester, VT, just north of Burlington, wireless speakerphones on harmonic is likely source of movie soundtrack heard on 2720.2 at 0129 some 85 km from me; could get out further (Mark Mohrmann, Coventry VT, CIDX Messenger) When does it close for winter? (gh)

VENEZUELA R. Nacional de Venezuela's reactivated external service on 9540, one hour daily each in Spanish, airs first at 1800, repeated at 2100, 0000, 0300, 1100, 1400 (BBC Monitoring)

VIETNAM [non] VOV relay via Russia moved already Sept. 7 from 7250 to 5940 at 0100 in English, but overpowered by Dr Scott on 5935; VOV is better at 0330 in English on 7260 after Spanish (Ivan Grishin, Ont., World of Radio)

WESTERN SAHARA [non] National R. of the Saharan Arab Democratic Republic, via Algeria on 11610 from *1800//1544 MW (Dieter Leupold, Morocco, ORF DX Telegramm via BC-DX) Direction-finding puts site at Tindouf in southern Algeria; MW used to vary around 1355 (Wolfgang Büschel, BC-DX) and 1544 even heard in New England by Bruce Conti, Mark Connelly (NRC International DX Digest)

ZIMBABWE ZBC R. 2 back on 5012 after many years, *1500-1630* mostly in African language, some English; ORM de Madagasdar on 5010 (Mahendra Vaghjee, Mauritius, DSWCI DX Window)

Until the Next, Best of DX and 73 de Glenn!



Gayle Van Horn

- 0015 UTC on 17555**
USA: KWHH-Hawaii. First day broadcast for frequency testing. Also heard on 11565 from 1212-1255. (Lee Silvi, Mentor, OH)
- 0015 UTC on 4935**
BRAZIL: Radio Capixaba. Portuguese program segment with children to pop tunes, fair signal. (Tom Banks, Dallas, TX) Brazil's **Cancao Nova** with sports commentary on 4825 at 0335. (Will Passman, Germany/Hard-Core-DX)
- 0023 UTC on 11794.3**
BRAZIL: Radio Guaiba. Portuguese. Interviews and sports related chatter, // 6000. Time pips and ads. Station noted at 0226, 11785 with easy-listening music and full station ID. (Bob Hill, Littleton, MA/Fine Tuning)
- 0030 UTC on 9022**
IRAN: VOIRI. English sign-on ID into national anthem. Holy Koran recitations, // 9685 better signal, no sign of // 6050 to Europe. English text on Islamic laws, ID/frequency quote and program preview. (Frank Hillton, Charleston, SC) Monitored to 0127 (Silvi, OH; Sue Wilden, Columbus, IN)
- 0042 UTC on 15115**
NEW ZEALAND: Radio NZ Int'l. World news on North Korea to *World Watch* magazine show with segment on NATO and the Balkans. Recheck with time tips 0100 into ID and national news and weather. (Sam Wright, Biloxi, MS; Howard J. Moser, Lincolnshire, IL)
- 0055 UTC on 5010**
INDIA: AIR-Thiruvananthapuram. Patriotic songs to advertisement, followed by commentary in Malayalam. **AIR-Srinagar** on 4950 1716-1731. **AIR-Shimla** on 3223 1732-1733 with English newscast. (Mark Veldhuis, Borne, Netherlands/Hard-Core-DX)
- 0109 UTC on 9485**
BULGARIA: Radio Bulgaria. Programming announcements to feature, *Music Party in Bulgaria*. (Wilden, IN) Noted on 11720 at 1920. (Bob Fraser, Cohasset, MA)
- 0118 UTC on 9580**
HUNGARY: Radio Budapest. *Hungary Today* program discussing national beer consumption. (Moser, IL)
- 0131 UTC on 7290**
SWEDEN: Radio Sweden. News on Sweden withdrawing support for Bosnia. (Moser, IL)
- 0135 UTC on 7450**
GREECE: Voice of Greece. World news on Albania and NATO summit. (Moser, IL) VOG on 9590 at 1342 in English and Greek. (Wilden, IN)
- 0143 UTC on 7160**
ALBANIA: Radio Tirana. Instrumental interval to English sign-on. ID/frequency schedule and national news. (Moser, IL)
- 0216 UTC on 5629.8**
PERU: Radio Ilucan (tentative). Romantic ballads to Spanish time checks, no ID heard. Peru's **Radio Altura** noted 0310-0325, on 3339.9 with IDs, music and Happy Birthday routine. (Veldhuis, NLD) **Radio Altura** on 3340 at 0233. (Passman, Germany)
- 0220 UTC on 15575**
SOUTH KOREA: Radio Korea Int'l. Magazine show featuring interview on developments on the Internet to 0231. Feature on the *Seoul International Music Festival*. (Wright, MS)
- 0325 UTC on 7300**
TURKEY: Voice of Turkey. *DX Corner* to 0330. Fair to good signal with rapid polar flutter. (Walter Salmaniwi/Hard-Core-DX; Fraser, MA; Moser, IL) **Turkish State Meteorology Radio** on 6900 at 0425, with Turkish music. (Passman, Germany)
- 0325 UTC on 6010**
MEXICO: Radio Mil. Spanish text and music with fair quality. (Moser, IL)
- 0329 UTC on 7200**
SUDAN: Radio Ormdurman. Arabic music to announcer's Arabic text, no ID noted at 0330. (Moser, IL)
- 0429 UTC on 4904**
CHAD: Radiodiff. Nationale Tchadienne. French sign-on, national anthem, ID and regional music. (Passman, Germany) Station noted 1957 for three minutes before CRI's program via Switzerland. (Mark Veldhuis, Borne, Netherlands; Mahendra Vaghjee, Rose Hill, Mauritius)
- 0430 UTC on 5054.9**
GUYANA: RFO. News and commentary in French. Very weak, better to monitor in USB. (Klaus Elsebusch, Hard-Core-DX)
- 0448 UTC on 7474.75**
TUNISIA: RTV Tunisienne. Arabic. Traditional music alternating with western style tunes. Fair reception. (Salmaniwi, Hard-Core-DX). Arabic news and music to Europe on 7475, 2105-2200. (Silvi, OH)
- 1004 UTC on 4926.50**
BOLIVIA: Radio San Miguel. Comments from announcer, fair signal quality. (Charles Bolland, Lake Worth, FL/Cumbre DX) Bolivia's **Radio Movima** on 4471 at 0214. (Passman, Germany)
- 1020 UTC on 4552.33**
BOLIVIA: Emisoras Tropico. Text and music fading by 1030. Bolivia's **Los Andes** heard on 4777.73 at 1035-1050 with IDs and regional music and fade out by 1042. (Bolland, FL) Radio **Perla del Acre** on 4599.9 at 0240-0258*. (Passman, Germany)
- 1030 UTC on 4746.82**
PERU: Radio Huanta Dos Mil. Very weak signal barely audible with text and music. Peru's **Radio Luz y Sonido** (tentative) on 3234.81 at 1038. (Bolland, FL)
- 1040 UTC on 9580**
AUSTRIA: Radio Austria Int'l. *Innovation* report on a study of Australian desert flora. *Mailbag* program on 13730 at 1238. (Bob Fraser, Cohasset, MA)
- 1110 UTC on 6014.88**
COLOMBIA: Radio Mira. Spanish. Rosary in progress at tune-in. CARACOL news at 1130, fanfare and canned ID. Good signal, light to moderate splash Singapore-6015. (Jay Novello, Wake Forest, NC/FT)
- 1459 UTC on 11785**
INDONESIA: RRI-Jakarta (Java). Interval signal, Indonesian ID, " warta berita," co-channel Russian and Qatar interference. (Veldhuis, NLD)
- 1530 UTC on 3273**
MOZAMBIQUE: Radio Mozambique. News relay from Moputo in Swahili, Portuguese music and news. National anthem to 2205*. Fair to good reception. (Vaghjee, MAU)
- 1821 UTC on 4925**
INDONESIA: RRI-Jambi (tentative). Non stop Indonesian pops and ballads. Abruptly off the air at 1847. Station also noted 2206-2211. (Veldhuis, NLD)
- 1855 UTC on 3945**
VANUATU: Radio Vanuatu. Sign-on ID, national anthem and programming in local dialect. (Jari Lehtinen, Finland/Hard-Core-DX)
- 1906 UTC on 11990**
KUWAIT: Radio Kuwait. Pop music to English breaks and relay ID as, "FM92.5 Radio Kuwait," monitored to 2052+. (Silvi, OH)
- 1945 UTC on 9670**
ITALY: RAI. Item on Pompeii is still the number one tourist spot in Italy. Italian service on 6010 at 2330 with *Musica Classica* program. (Fraser, MA) RAI on 6010 at 0322. (Moser, IL)
- 2001 UTC on 15160**
ALGERIA: Radio Algiers Int'l. Pop music and English talk to Europe, // 11715. (Silvi, OH)
- 2005 UTC on 12085**
SYRIA: Radio Damascus. English broadcast plus music and *Profiles* segment. Signal better during 2005-2100, // 13160. (Silvi, OH)
- 2100 UTC on 9935**
GREECE: Radio Stathmos Makedonias. Lots of very nice music and text in Greek to 2205*. (Silvi, OH)
- 2100 UTC on 15515**
USA: Radio Free Asia. English ID, "this is Radio Free Asia, the following program is in Chinese." Lao service noted 2200 on 9395//5930, Korean text on 15515, // 11785 and Chinese on 11955 at 1729. (Gayle Van Horn, Brasstown, NC)
- 2105 UTC on 11635**
CROATIA: Croatian Radio. Regional music and text in presumed Croatian. News in English from 2205-2208. (Silvi, OH)
- 2133 UTC on 13760**
NORTH KOREA: Radio Pyongyang. *Listener's Mailbag* program and discussion about national anthem. Station ID at 2140, outstanding signal for this time of day. (Mark J. Fine, Remington, VA)
- 2150 UTC on 9950**
EGYPT: Radio Cairo. *You Ask, We Answer* program discussing libraries. (Fraser, MA)
- 2205 UTC on 5005**
MALAYSIA: RTM Sibn. Audible to 2215 with music and announcer's chat, vanished by 2225. Recheck next day with Malay music at 2255, ID 2300. SINPO=24132. (Zacharias Liangas, Thessaloniki, Greece)
- 2220 UTC on 6049.9**
NIGERIA: FRCN/Radio Nigeria via Ibadan. Indigenous African music to vernaculars language text, not // with Kaduna 4770. Afro pops to 2230. (Van Horn, NC; Liangas, GRC) Kaduna noted 1940-2019. (Vaghjee, MAU)
- 2310 UTC on 5039**
PERU: Radio Libertad de Junin. Easy listening Spanish tune and announcements. SINPO=24242. **La Voz de la Selva** on 4824, 2338-2348, most audible in LSB. (Veldhuis, NLD)

Thanks to our contributors — Have you sent in YOUR logs?
Send to **Gayle Van Horn**, c/o *Monitoring Times* (or e-mail gayle@grove.net)
English broadcast unless otherwise noted.

English Program News Joins Cyberspace

David Holland checks in from near London, England, with news of his Internet website, *English Language Program News*, located at: <http://www.btinternet.com/~radioprograms>.

David's site is listed by broadcaster with program guides, frequency/time schedules, and links to each shortwave broadcaster's homepage.

Although the website is "under construction," it is currently directed mainly to listeners in Europe, Africa, and the Middle East. Much of what is included will also be of interest to DXers in other parts of the world. ELPN is constantly being updated with the latest information. Good luck, David!

AM/FM and TV DXers have an Internet Radio Forum

available through email subscription. This fine email list discusses AM, FM, and TV DXing. Topics include logs, station information, listening tips, DX tests, QSL information, and equipment. There is no charge for this service. To join the list send an email message to: majordomo@grove.net. In the message type:

subscribe AMFMTVDX
END

To subscribe to the digest instead, type:

subscribe AMFMTVDX-digest
END

AM/FM/TV DX is moderated by MT's assistant editor Larry Van Horn.

COASTAL RADIO

Manzanillo Radio/XFM, 12895.5 kHz. Full data QSL letter and station card signed by Ing. Luis Guzman Suarez and stamped with station's seal. Received in 57 days for an English utility report and one U.S. dollar. Station address: XFM, Manzanillo Radio, Apartado Postal 293, Manzanillo, Colima, Mexico. (The Staff of Radio Mauser Worldwide)

FINLAND

YLE/Radio Finland, 11900 kHz. Full data transmitter scenery card with illegible veri signature. Received in 37 days for an English "period" reception report. (monitoring from June-August) and one IRC. Station address: Finnish Broadcasting Co., Shortwave Centre, Preiviki, FIN-28660 Pori, Finland. (Stokes Schwartz, Madison, WI)

FM/MEDIUM WAVE

WALX, 100.9 FM. Full data prepared QSL card verified, plus station bumper sticker, pen, and business card. Received in one month for an FM report and return mint postage. Station address: Persimmon Tree Rd., Selma, AL 36701. (Robert S. Ross-VA3SW, London ONT, Canada, AM/FM/TV DX)

KOOP 91.7 FM. Full data letter signed by James R. Ellinger-P.R., plus business cards, stickers, coffee mug, copy of Austin, Texas, newspaper (which included an article about my reception of KOOP, and said mine was their first DX report!) Station reporter also called me and conducted an interview. Station is only 3,000 watts, they were amazed KOOP was heard in Canada. Note with QSL says a T-shirt is on the way. Received letter in one month for an English FM report. Station address: 1143 North Western, Austin, TX 78702. (Ross, CAN)

WTOP 1500 AM. No data color transmitter/studio card unsigned. Received in 189 days for an English AM follow-up report and return mint postage (used on reply). Station address: 3400 Idaho Dr., N.W., Washington, DC 20016. (Randy Stewart, Springfield, MO)

WTIC 1080 AM. Full data 8x10 color certificate (suitable for framing and hanging proudly in our shack!), signed by Garnet Draklotes-Chief Operator. Station overview, business card, program schedule, coverage map, and station history sheet included. Received in nine months for an English AM report and return mint postage. Station address: One Financial Plaza, Hartford, CT 06103. (Larry Van Horn, Brasstown, NC)

IRAN

VOIRI, 9022 kHz. Full data QSL card of *Khajou Bridge* unsigned. Program schedule, station sticker, IRIB newsletter, reception report form, *Meaning of Islam* booklet, magazine and *Iran Times* newspaper (a used copy...complete with doodles and ads torn out!). Received in 44 days for an English report. Station address from reception report: P.O. Box 19395-3333, Tehran, Islamic Republic of Iran. Addition address: IRIB External Service, P.O. Box 19395-6767, Tehran. (Stewart, MO)



Larry Van Horn's QSL certificate from WTIC

MOLDOVA

Radio Dniester International, 11750 kHz. Full data color card with illegible signature and two station stamps. Received in 240 days for an English report via Rumen Pankov of QSL Bureau-Sofia, Bulgaria, of report taken during June-July 1995. Also contained one letter, postcard, one U.S. dollar and one IRC. Several follow-up reports sent to Dniester offices with no response. QSL address: Rumen Pankov, c/o QSL-Bureau, P.O. Box 199, BG-1000 Sofia-C, Bulgaria. (Schwartz, WI)

NON-DIRECTIONAL BEACONS

UMP, 266 kHz, Indianapolis, Indiana. Full data prepared QSL card signed by David Cooper. Received for an English utility report of CW IDs, and return mint postage. Station address: Indianapolis Metropolitan Airport, Indianapolis, IN 46206. (Hank Holbrook, Dunkirk, MD)

CNC, 335 kHz, Charlton, Iowa. Full data QSL letter signed by Wayne Whitfield-Airport Manager, and copy of the station license, official station call letters are WRLB 2527. Received for an English utility report of CW IDs, and return mint postage. Station address: Whitfield Flying Service, P.O. Box 26, Municipal Airport, Charlton, IA 50049. (Holbrook, MD)

SHIP TRAFFIC

S/S John G. Munson WE3806, 4077 kHz USB (Tanker). Full data prepared QSL card verified. Received in 18 days for an English utility report and photo of vessel. Ship address: c/o Detroit Marine Post Office, River Station, Detroit, MI 48222. (Steve McDonald-VE7SL, Port Coquitlam BC, Canada)

M/V Fuji Moru JHOK, 12443 kHz USB (Bulk). Full data prepared QSL card, plus photo of vessel. Received in 33 days for an English utility report. Ship address: Nitoh, Chief of Ship Managing Section, Shizuoka Pref. Fisheries Experimental Station, 3690 Shioiri Kogawa, Yaizu-city, Shizuoka Pref, Japan (McDonald, CAN)

M/V Sea Venture WJMV, 156.65 MHz. Full data prepared QSL card signed by John Bischoff-Radio Officer. Received for an English utility report and return mint postage. Ship address: Atlantic Tankships, Inc., 5 Koger Centre, P.O. Box 13348, Norfolk, VA 23506. (Holbrook, MD)

Sealand Crusader WZJF, 156.8/156.6 MHz. Full data prepared QSL card verified. Received for an English utility report and return mint postage. Ship address: Sealand Service, Inc., P.O. Box 2000, Elizabeth, NJ 07207. (Holbrook, MD)

UGANDA

Radio Uganda, 4976 kHz. Special QSL card on preprinted QSL paper, signed by L.B. Libega. Received for an English report of two consecutive days of monitoring. Station address: Ministry of Information, Radio Uganda English Division, P.O. Box 2038, Kampala, Uganda. (Zacharias Liangas, Thessaloniki, Greece)



HOW TO USE THE SHORTWAVE GUIDE

1: Convert your time to UTC.

Eastern and Pacific Times are already converted to Coordinated Universal Time (UTC) at the top of each page. The rule is: convert your local time to 24-hour format; add (during Standard Time) 5, 6, 7, or 8 hours for Eastern, Central, Mountain or Pacific Times, respectively.

Note that all dates, as well as times, are in UTC; for example, a show which might air at 0030 UTC Sunday will be heard on Saturday evening in America (7:30 pm Eastern, 4:30 pm Pacific).

2: Choose a program or station you want to hear.

Some selected programs appear on the lower half of the page for prime listening hours—space does not permit 24-hour listings.

Occasionally program listings will be followed by "See X 0000." This information indicates that the program is a rerun, and refers to a previous summary of the program's content. The letter stands for a day of the week, as indicated below, and the four digits represent a time in UTC.

S: Sunday T: Tuesday H: Thursday A: Saturday
M: Monday W: Wednesday F: Friday

3: Find the frequencies for the program or station you want to hear.

Look at the page which corresponds to the time you will be listening. Comprehensive frequency information for English broadcasts can be found at the top half of the page. All frequencies are in kHz.

The frequency listing uses the same day codes as the program listings; if a broadcast is not daily, those day codes will appear before the

station name. Irregular broadcasts are indicated "tent" and programming which includes languages besides English are coded "vl" (various languages).

4: Choose the most promising frequencies for the time, location and conditions.

Not all stations can be heard and none all the time on all frequencies. To help you find the most promising frequency, we've included information on the target area of each broadcast. Frequencies beamed toward your area will generally be easier to hear than those beamed elsewhere, even though the latter will often still be audible. Every frequency is followed by one of these target codes:

am: The Americas	as: Asia
na: North America	au: Australia
ca: Central America	pa: Pacific
sa: South America	va: various
eu: Europe	do: domestic broadcast
af: Africa	om: omnidirectional
me: Middle East	

Consult the propagation charts. To further help you find the right frequency, we've included charts at the back of this section which take into account conditions affecting the audibility of shortwave broadcasts. Simply pick out the region in which you live and find the chart for the region in which the station you want to hear is located. The chart indicates the optimum frequencies for a given time in UTC.

SWL PROGRAMS

COMPILED BY JIM FRIMMEL

Sundays

0020 Radio Exterior de Espana "Distance Unknown"
0109 HCJB (am): "DX Partyline"
0120 Radio Exterior de Espana "Distance Unknown"
0200 Radio For Peace Intl: "World of Radio"
0234 Radio Havana Cuba: "DXers Unlimited"
0258 Vatican Radio: "On-the-Air"
0300 WWCR #3 (Tennessee): "Spectrum"
0305 Australia, Radio: "Feedback"
0409 HCJB (am): "DX Partyline"
0415 Voice of Turkey: "DX Corner" (biweekly)
0434 Radio Havana Cuba: "DXers Unlimited"
0508 Vatican Radio: "On-the-Air"
0520 Radio Exterior de Espana "Distance Unknown"
0530 Australia, Radio: "Media Report"
0605 WWCR #3 (Tennessee): "Ham Radio and More"
0634 Radio Havana Cuba: "DXers Unlimited"
0830 Radio Korea: "Shortwave Feedback"
0835 Radio Vlaanderen Intl: "Radio World"
0900 Radio For Peace Intl: "World of Radio"
0905 BBC (am/au/af/as): "Write On"
1000 WWCR #1 (Tennessee): "World of Radio"
1040 Radio Korea: "Shortwave Feedback"
1100 AWR Latin America: "Wavescan"
1205 BBC (am/au): "Write On"
1205 BBC (af): "Write On"
1215 WWCR #1 (Tennessee): "Ask WWCR"
1230 Radio Korea: "Shortwave Feedback"
1240 Radio Korea: "Shortwave Feedback"
1305 Radio Vlaanderen Intl: "Radio World"
1315 Radio Bulgaria: "Radio Bulgaria Calling"
1352 Vatican Radio: "On-the-Air"
1501 BBC (af/as): "Waveguide" (4)
1630 KWHR (Hawaii): "DXing with Cumbre"
1630 Radio Korea: "Shortwave Feedback"
1705 BBC (as): "Write On"
1735 Radio Vlaanderen Intl: "Radio World"
1830 KWHR (Hawaii): "DXing with Cumbre"
1835 Radio Vlaanderen Intl: "Radio World"
1930 Radio Korea: "Shortwave Feedback"
2000 WRMI (Florida): "Wavescan"
2010 Radio Korea: "Shortwave Feedback"
2100 AWR-Europe (Slovakia): "Wavescan"
2105 BBC (am/as/au): "Write On"

2105 Radio Vlaanderen Intl: "Radio World"
2130 Radio Korea: "Shortwave Feedback"
2135 BBC (af): "Write On"
2230 Radio Canada Intl: "Now the Details"
2245 Radio Bulgaria: "Radio Bulgaria Calling"
2300 AWR Latin America: "DXing with Cumbre"
2300 WWCR #3 (Tennessee): "Ham Radio and More"
2300 KSDA (Guam): "Wavescan"
2300 Radio For Peace Intl: "World of Radio"
2330 Australia, Radio: "Media Report"

Mondays

0015 WWCR #3 (Tennessee): "Ask WWCR"
0230 Radio Korea: "Shortwave Feedback"
0305 BBC (af/am/au): "Write On"
0400 WWCR #1 (Tennessee): "World of Radio"
0430 Radio New Zealand Intl: "Mailbox" (biweekly)
0545 Radio Bulgaria: "Radio Bulgaria Calling"
0700 Radio For Peace Intl: "World of Radio"
0730 BBC (af): "Waveguide" (4)
0905 WWCR #1 (Tennessee): "Spectrum"
1040 All India Radio: "DX-ers Corner" (2/4)
1615 KTWIR (Guam): "Pacific DX Report"
1840 All India Radio: "DX-ers Corner" (2/4)
1915 Radio Tallinn: "Radio Estonia DX Program"
2130 All India Radio: "DX-ers Corner" (2/4)
2200 WWCR #1 (Tennessee): "Ask WWCR"

Tuesdays

0500 WGTG (Georgia): "World of Radio"
0900 WWCR #1 (Tennessee): "Ham Radio and More"
0900 KTWIR (Guam): "Pacific DX Report"
1146 Radio Sweden: "MediaScan" (1/3)
1210 AWR Latin America: "Wavescan"
1246 Radio Sweden: "MediaScan" (1/3)
1330 WWCR #1 (Tennessee): "World of Radio"
1346 Radio Sweden: "MediaScan" (1/3)
1355 FEBC (Philippines): "DX Dial"
1730 BBC (am/au): "Waveguide" (4)
1746 Radio Sweden: "MediaScan" (1/3)
1900 Radio For Peace Intl: "World of Radio"
2100 Polish Radio: "Polish Radio DX Club"
2109 Radio Havana Cuba: "DXers Unlimited"
2309 Radio Havana Cuba: "DXers Unlimited"
2340 All India Radio: "DX-ers Corner" (2/4)

Wednesdays

0135 Radio Havana Cuba: "DXers Unlimited"
0146 Radio Sweden: "MediaScan" (1/3)
0246 Radio Sweden: "MediaScan" (1/3)
0300 Radio For Peace Intl: "World of Radio"
0335 Radio Havana Cuba: "DXers Unlimited"
0345 BBC (as): "Waveguide" (4)
0346 Radio Sweden: "MediaScan" (1/3)
0535 Radio Havana Cuba: "DXers Unlimited"
0830 HCJB (eu): "Ham Radio Today"
0930 HCJB (pac): "Ham Radio Today"
1000 Radio For Peace Intl: "World of Radio"
1230 BBC (am/au): "Waveguide" (4)
1315 FEBC (Philippines): "DX Dial"
1500 WRMI (Florida): "Wavescan"
1820 Polish Radio: "Polish Radio DX Club"
1920 Argentina, RAE: "DXers Special"
1930 HCJB (eu): "Ham Radio Today"
2206 Radio Budapest Intl: "Radio Budapest DX Show"
2300 Radio For Peace Intl: "Continent of Media"
2345 BBC (as): "Waveguide" (4)

Thursdays

0130 HCJB (am): "Ham Radio Today"
0239 Argentina, RAE: "DXers Special"
0336 Radio Budapest Intl: "Radio Budapest DX Show"
0430 HCJB (am): "Ham Radio Today"
0700 Radio For Peace Intl: "Continent of Media"
0754 Radio Netherlands Intl: "Media Network"
0830 Radio New Zealand Intl: "Mailbox" (biweekly)
0953 Radio Netherlands Intl: "Media Network"
1153 Radio Netherlands Intl: "Media Network"
1320 Polish Radio: "Polish Radio DX Club"
1352 Radio Netherlands Intl: "Media Network"
1515 BBC (as): "Waveguide" (4)
1515 Radio Netherlands Intl: "Media Network"
1954 Radio Netherlands Intl: "Media Network"
2130 WWCR #1 (Tennessee): "World of Radio"

Fridays

0053 Radio Netherlands Intl: "Media Network"
0253 Radio Netherlands Intl: "Media Network"
0453 Radio Netherlands Intl: "Media Network"
0730 Australia, Radio: "Media Report"
1045 KTWIR (Guam): "Pacific DX Report"
1930 Radio New Zealand Intl: "Mailbox" (biweekly)

2000 Radio For Peace Intl: "World of Radio"
2046 Radio Bulgaria: "Radio Bulgaria Calling"
2100 WWCR #1 (Tennessee): "Ask WWCR"
2105 Australia, Radio: "Feedback"
2300 WRMI (Florida): "Wavescan"

Saturdays

0010 Australia, Radio: "Feedback"
0046 Radio Bulgaria: "Radio Bulgaria Calling"
0230 KWHR (Hawaii): "DXing with Cumbre"
0400 Radio For Peace Intl: "World of Radio"
0500 WHRI (Angel 1/2): "DXing with Cumbre"
0605 Australia, Radio: "Feedback"
0700 WWCR #1/3 (Tennessee): "World of Radio"
0809 HCJB (eu): "DX Partyline"
0909 HCJB (pac): "DX Partyline"
0940 FEBC (Philippines): "DX Dial"
0940 KTWIR (Guam): "Pacific DX Report"
1015 WWCR #3 (Tennessee): "Ask WWCR"
1030 Voice of America (as pac): "Communications World"
1100 Radio For Peace Intl: "World of Radio"
1230 Voice of America (as pac): "Communications World"
1230 WWCR #3 (Tennessee): "World of Radio"
1342 Radio Tashkent: "Radio Tashkent DX Program"
1345 Voice of Turkey: "DX Corner" (biweekly)
1430 WHRI (Angel 2): "DXing with Cumbre"
1455 FEBC (Philippines): "DX Dial"
1730 Voice of America (af/me/south as): "Communications World"
1730 WHRI (Angel 1): "DXing with Cumbre"
1800 Radio For Peace Intl: "World of Radio"
1909 HCJB (eu): "DX Partyline"
1958 Vatican Radio: "On-the-Air"
2015 Voice of Turkey: "DX Corner" (biweekly)
2104 Radio Havana Cuba: "DXers Unlimited"
2130 WWCR #3 (Tennessee): "Ask WWCR"
2130 Voice of America (me): "Communications World"
2131 Radio Exterior de Espana: "Distance Unknown"
2230 WHRI (Angel 1): "DXing with Cumbre"
2230 WRMI (Florida): "Wavescan"
2300 Vatican Radio: "On-the-Air"
2300 KSDA (Guam): "Wavescan"

FREQUENCIES

0000-0100	Anguilla, Caribbean Beacon	6090am				0000-0100	Turkey, Voice of	6135na	7280eu	9655na	
0000-0100	Australia, Radio	9660pa	12080pa	13605pa	13755pa	0000-0100	United Kingdom, BBC WS	5965as	5970am	5975am	6175am
		15510pa	17750as	17795pa				6195as	9410as	9590am	9915as
								11750sa	11955as	15310as	
0000-0100 vl	Australia, VL8K Katherine	5025do				0000-0045	United Kingdom, BBC WS	3915as			
0000-0100 vl	Australia, VL8T Tent Crk	4910do				0000-0030	United Kingdom, BBC WS	7110as	9580as	11945as	15280as
0000-0100	Bulgaria, Radio	7480na	9435na			0000-0100	United Kingdom, UCB	6200eu			
0000-0015	Cambodia, Natl Voice of	11940as				0000-0100	USA, KAIJ Dallas TX	13815am			
0000-0100	Canada, CBC N Quebec Svc	9625do				0000-0100	USA, KTNB Salt Lk City UT	15590am			
0000-0100	Canada, CFRX Toronto	6070do				0000-0100	USA, KWHR Naalehu HI	17555pa			
0000-0100	Canada, CFVP Calgary	6030do				0000-0100	USA, Monitor Radio Intl	7535am	9430am	15665as	
0000-0100	Canada, CHNX Halifax	6130do				0000-0100	USA, Voice of America	7215as	9770as	11760as	15185as
0000-0100	Canada, CKZN St John's	6160do						15290as	17735as	17820as	
0000-0100	Canada, CKZU Vancouver	6160do				0000-0100 twtfa	USA, Voice of America	5995am	6130am	7395am	7405am
0000-0027	Czech Rep, Radio Prague	5930na	7345na					9455am	9775am	11695am	13740am
0000-0100	Ecuador, HCJB	9745am	21455am					5825na	9975na	13615na	
0000-0030	Egypt, Radio Cairo	9900na				0000-0100	USA, WEWN Birmingham AL	5085am			
0000-0015 vl	Ghana, Ghana Broad Corp	3366do	4915do			0000-0100	USA, WGTG McCaysville GA	5745am			
0000-0045	India, All India Radio	7150as	9705as	9950as	11620as	0000-0100	USA, WHRI Noblesville IN	9955am			
0000-0100	Japan, R Japan/NHK World	6155eu	6180eu			0000-0100	USA, WRMI/R Miami Intl	7355am			
0000-0100	Lebanon, Voice of Hope	9960va				0000-0100	USA, WRNO New Orleans LA	5070am	7435am	9475am	13845am
0000-0100	Liberia, LCN/R Liberia Int	5100do				0000-0100	USA, WWCR Nashville TN	6085na	9505ca		
0000-0100	Malaysia, Radio	7295do				0030-0055	Austria, R Austria Intl	9655na			
0000-0100	Malaysia, RTM Kuching	7160do				0030-0055	Belgium, R Vlaanderen Int	9925sa	11690am		
0000-0100	Netherlands, Radio	6020na	6165na	9845na		0030-0100	Iran, VOIRI	6050eu	9022eu	9685eu	
0000-0100	New Zealand, R NZ Intl	15115pa				0030-0100	Netherlands, Radio	5905as	7305as	9855as	11655as
0000-0057	North Korea, R Pyongyang	11845na	13650na	13760na	15230na	0030-0100	Sri Lanka, Sri Lanka BC	9730as			
0000-0100 vl	Papua New Guinea, NBC	9675do				0030-0100	Thailand, Radio	9655va	11905va	15395as	
0000-0100	Russia, Voice of Russia WS	5940na	7250na	9665na		0035-0040	India, All India Radio	5010do	7110do	11870do	
0000-0100 vl	Solomon Islands, SIBC	5020do				0050-0100	Italy, RAI Intl	6010na	9675na	11800na	
0000-0100	Spain, R Exterior Espana	6055am									
0000-0030	Thailand, Radio	9655af	9690af	11905af							

SELECTED PROGRAMS

Sundays

- 0000 Spain, R Exterior de Espana: News. A ten-minute summary of world news.
- 0000 USA, WGTG McCaysville GA: Music. Recordings of contemporary christian or gospel music.
- 0011 Spain, R Exterior de Espana: Cultural Encounters. Highlighting cultural interaction between Spain and North America.
- 0020 Spain, R Exterior de Espana: Distance Unknown. A program for shortwave listeners and DXers.
- 0028 USA, WEWN Birmingham AL: Scandals of the Cross and Its Triumph. No information available.
- 0036 Spain, R Exterior de Espana: Spanish Poparama. The latest pop music hits in Spain as well as some oldies.
- 0056 Spain, R Exterior de Espana: Program Announcements. Descriptions of Spanish National Radio's programs and schedule information.

Mondays

- 0000 USA, WEWN Birmingham AL: The Gospel of the Holy Spirit. See S 1630.
- 0000 Spain, R Exterior de Espana: News. See S 0000.
- 0000 USA, WGTG McCaysville GA: USA Radio News. See S 0200.
- 0005 USA, WGTG McCaysville GA: Classic Stories. Paul Wright reads books for children.
- 0011 Spain, R Exterior de Espana: Visitors Book. Who's visiting Spain this week.
- 0022 Spain, R Exterior de Espana: Spanish Echoes. Music with a Spanish accent.
- 0028 USA, WEWN Birmingham AL: Pro-Life Issues. Dr. John Wilke, president of the International Right to Life, presents his views.
- 0030 USA, WEWN Birmingham AL: Franciscan University Connection. Father Michael Scanlon and guests speak from Steubenville, Ohio.
- 0030 USA, WGTG McCaysville GA: Explore the Word. Follow along with some bible reading.
- 0038 Spain, R Exterior de Espana: Radio Club. Listener letters are answered and music requests played.
- 0044 USA, WEWN Birmingham AL: Food for the Journey. Anne Shields with a program of reflections.

Tuesdays

- 0000 USA, WEWN Birmingham AL: Crisis in Culture. Father George Rutler examines a current issue.
- 0000 Spain, R Exterior de Espana: The News from Spain. A half-hour of news about Spain, Europe, and the world. The Spanish weather and cultural scene are also featured.
- 0000 USA, WGTG McCaysville GA: USA Radio News. See S 0200.
- 0005 USA, WGTG McCaysville GA: Classic Stories. See M 0005.

- 0028 USA, WEWN Birmingham AL: Pro-Life Issues. See M 0028.
- 0030 USA, WEWN Birmingham AL: Franciscan University Connection. See M 0030.
- 0030 Spain, R Exterior de Espana: Spanish Music. Popular music currently heard in Spain.
- 0030 USA, WGTG McCaysville GA: Explore the Word. See M 0030.
- 0036 Spain, R Exterior de Espana: Press Review. Review of the Spanish and international press.
- 0041 USA, WEWN Birmingham AL: In Season - Out of Season. See M 1244.
- 0041 Spain, R Exterior de Espana: Entertainment in Spain. Current favorites and personalities from the world of stage and screen.
- 0051 Spain, R Exterior de Espana: Spanish Course by Radio. A course in Spanish with English commentary.

Wednesdays

- 0000 USA, WEWN Birmingham AL: Pro-Life Update. Father Frank Pavone speaks out against abortion.
- 0000 Spain, R Exterior de Espana: The News from Spain. See T 0000.
- 0000 USA, WGTG McCaysville GA: USA Radio News. See S 0200.
- 0005 USA, WGTG McCaysville GA: Classic Stories. See M 0005.
- 0028 USA, WEWN Birmingham AL: Pro-Life Issues. See M 0028.
- 0030 USA, WEWN Birmingham AL: Franciscan University Connection. See M 0030.
- 0030 Spain, R Exterior de Espana: Spanish Music. See T 0030.
- 0030 USA, WGTG McCaysville GA: Explore the Word. See M 0030.
- 0034 Spain, R Exterior de Espana: Press Review. See T 0036.
- 0039 Spain, R Exterior de Espana: Kaleidoscope. Spanish cultural life both in Spain and abroad.
- 0044 USA, WEWN Birmingham AL: Food for the Journey. See M 0044.
- 0047 Spain, R Exterior de Espana: Spanish Course by Radio. See T 0051.

Thursdays

- 0000 USA, WEWN Birmingham AL: Our Lady in Scripture and Tradition. This series draws from the rich teachings found in scripture and tradition about Mary and her many apparitions (Fr. Andrew Apostoli).
- 0000 Spain, R Exterior de Espana: The News from Spain. See T 0000.
- 0000 USA, WGTG McCaysville GA: USA Radio News. See S 0200.
- 0005 USA, WGTG McCaysville GA: Classic Stories. See M 0005.
- 0028 USA, WEWN Birmingham AL: Pro-Life Issues. See M 0028.
- 0030 USA, WEWN Birmingham AL: Franciscan University Connection. See M 0030.

- 0030 Spain, R Exterior de Espana: Spanish Music. See T 0030.
- 0030 USA, WGTG McCaysville GA: Explore the Word. See M 0030.
- 0034 Spain, R Exterior de Espana: Press Review. See T 0036.
- 0039 Spain, R Exterior de Espana: Window on Spain. A different region of Spain and its attractions are highlighted each week.
- 0041 USA, WEWN Birmingham AL: In Season - Out of Season. See M 1244.
- 0049 Spain, R Exterior de Espana: Spanish Course by Radio. See T 0051.

Fridays

- 0000 USA, WEWN Birmingham AL: Successful Fathering in the 90's. Steve Wood, Director of Family Life Center International, hosts this new series.
- 0000 Spain, R Exterior de Espana: The News from Spain. See T 0000.
- 0000 USA, WGTG McCaysville GA: USA Radio News. See S 0200.
- 0005 USA, WGTG McCaysville GA: Classic Stories. See M 0005.
- 0028 USA, WEWN Birmingham AL: Pro-Life Issues. See M 0028.
- 0030 USA, WEWN Birmingham AL: Franciscan University Connection. See M 0030.
- 0030 Spain, R Exterior de Espana: Press Review. See T 0036.
- 0030 USA, WGTG McCaysville GA: Explore the Word. See M 0030.
- 0036 Spain, R Exterior de Espana: Radio Club. See M 0038.
- 0044 USA, WEWN Birmingham AL: Food for the Journey. See M 0044.
- 0048 Spain, R Exterior de Espana: Spanish Course by Radio. See T 0051.

Saturdays

- 0000 USA, WEWN Birmingham AL: Proverbs - A Blueprint for Living. Father Mitch Pacwa of Loyola University.
- 0000 Spain, R Exterior de Espana: The News from Spain. See T 0000.
- 0000 USA, WGTG McCaysville GA: The Bible in Living Sound. See M 0405.
- 0028 USA, WEWN Birmingham AL: Say Yes. Dana and a guest with a time of encouragement and special music.
- 0031 Spain, R Exterior de Espana: Spanish Music. See T 0030.
- 0034 Spain, R Exterior de Espana: Press Review. See T 0036.
- 0039 Spain, R Exterior de Espana: Review of the Arts. A review of cultural activities in Spain and elsewhere.
- 0050 Spain, R Exterior de Espana: Spanish Course by Radio. See T 0051.
- 0056 Spain, R Exterior de Espana: Program Announcements. See S 0056.

FREQUENCIES

0100-0200	Anguilla, Caribbean Beacon	6090am				0100-0130	Switzerland, Swiss R Intl	6135na	9885na	9905ca	
0100-0200	Australia, Radio	12080pa	13605pa	13755pa	15415as	0100-0200	Ukraine, R Ukraine Intl	5905na	6010na	6020na	6090na
		15510pa	17750pa	17795pa				7150na	7180na	7240na	9550na
0100-0200 vl	Australia, VL8K Katherine	5025do						9560na	12040na		
0100-0200 vl	Australia, VL8T Tent Crk	4910do				0100-0200	United Kingdom, BBC WS	5965as	5970sa	5975am	6085am
0100-0200	Canada, CBC N Quebec Svc	9625do						6145am	6175am	6195as	9410as
0100-0200	Canada, CFRX Toronto	6070do						9590am	9605as	11750am	11955as
0100-0200	Canada, CFVP Calgary	6030do						15280as	15310as	15360as	
0100-0200	Canada, CHNX Halifax	6130do				0100-0200	United Kingdom, UCB	6200eu			
0100-0200	Canada, CKZN St John's	6160do				0100-0200	USA, KAIJ Dallas TX	5810am			
0100-0200	Canada, CKZU Vancouver	6160do				0100-0200	USA, KTBN Salt Lk City UT	15590am			
0100-0130	Canada, R Canada Intl	9535am	9755am	11715am	13670am	0100-0200	USA, KWHR Naalehu HI	17555pa			
0100-0200	Costa Rica, RF Peace Intl	7385am	7585am	15050am		0100-0200	USA, Monitor Radio Intl	7535na	9430sa		
0100-0200	Cuba, Radio Havana	6000na	9820na	9830na		0100-0200	USA, Voice of America	7115as	7205as	9635as	11705as
0100-0127	Czech Rep, Radio Prague	6200na	7345na					11725as	15170as	15250as	17740as
0100-0200	Ecuador, HCJB	9745am	21455am					17820as			
0100-0150	Germany, Deutsche Welle	6040na	6085na	6145na	9640na	0100-0200 twhfa	USA, Voice of America	5995am	6130am	7405am	9445am
		11810na						9775am	13740am		
0100-0115	Ghana, Ghana Broadc Corp	3366do	4915do			0100-0200	USA, WEWN Birmingham AL	5825eu			
0100-0200	Indonesia, Voice of	9525na				0100-0200	USA, WGTG McCaysville GA	5085am			
0100-0125	Iran, VOIRI	6050eu	9022eu	9685eu		0100-0200	USA, WHRI Noblesville IN	5745am			
0100-0200 th	Ireland W Coast R Ireland	9875am				0100-0200	USA, WINB Red Lion PA	11950am			
0100-0110	Italy, RAI Intl	6010na	9675na	11800na		0100-0200	USA, WJCR Upton KY	7490na			
0100-0200	Japan, R Japan/NHK World	5960na	11790as	11860as	11890na	0100-0200	USA, WRMI/R Miami Intl	9955am			
		13630am	15500as	15590as	17810as	0100-0200	USA, WRNO New Orleans LA	7355am			
		21610as				0100-0200	USA, WWCR Nashville TN	3215am	5070am	7435am	13845am
0100-0200	Lebanon, Voice of Hope	9960va				0100-0200	USA, WYFR Okeechobee FL	6065na	9505na	11550as	
0100-0200	Liberia, LCN/R Liberia Int	5100do				0100-0130	Uzbekistan, R Tashkent	7190eu	9375eu	9530eu	9715eu
0100-0200 smtwh	Malaysia, Radio	7295do						9740eu			
0100-0200 m	Malta, VO Mediterranean	13605am				0100-0126	Vietnam, Voice of	5940na			
0100-0125	Netherlands, Radio	6020na	6165na	9845na		0130-0200	Canada, R Canada Intl	9755am			
0100-0200	Netherlands, Radio	5905as	7305as	9855as		0130-0200 sm	Canada, R Canada Intl	9535am	11715am	13670am	
0100-0200	New Zealand, R NZ Intl	15115pa				0130-0150	Greece, Voice of	6260na	7450na	9420na	9935na
0100-0200 vl	Papua New Guinea, NBC	9675do				0130-0200	Guam, AWR/KSDA	17645as			
0100-0200	Philippines, FEBC/R Intl	15450as				0130-0200	Lithuania, Radio Vilnius	9855na			
0100-0200	Russia, Voice of Russia WS	7125na	7250na	7310na	9820na	0130-0200	Netherlands, Radio	5905as	9855as	11655as	
0100-0130 mtwhfa	Serbia, R Yugoslavia	9580na	11870na			0130-0200	Slovakia, AWR Europe	9465eu			
0100-0130	Slovakia, R Slovakia Intl	5930na	7300na	9440sa		0130-0200	Sweden, Radio	9435as			
0100-0200 vl	Solomon Islands, SIBC	5020do				0130-0200 s	Sweden, Radio	7290am			
0100-0200	Spain, R Exterior Espana	6055am				0140-0159	Vatican State, Vatican R	7335au	9650au		
0100-0200	Sri Lanka, Sri Lanka BC	9730as				0145-0200	Albania, R Tirana Intl	6115na	7160na		

SELECTED PROGRAMS

Sundays

- 0100 USA, WEWN Birmingham AL: Mother Angelica Live (encore). Down to earth (and sometimes humorous) inspiration.
- 0100 Germany, Deutsche Welle: News. World news from Deutsche Welle.
- 0100 Switzerland, Swiss R Intl: News. Five minutes of world news.
- 0100 USA, WGTG McCaysville GA: The Spoken Word of God. Alexander Scourby narrates the King James version of The New Testament.
- 0105 Switzerland, Swiss R Intl: Newsnet. Ten minutes of comment and backgrounders from correspondents; 15 minutes on what's happening in Switzerland.
- 0106 Germany, Deutsche Welle: Saturday Review. A weekend update of current events in Germany.
- 0115 Switzerland, Swiss R Intl: Capital Letters (2/4). SRI's bimonthly mailbag and listener contact program.
- 0115 Switzerland, Swiss R Intl: Sounds Good (3/5). Music from Switzerland and the people who make it.
- 0115 Switzerland, Swiss R Intl: The Name Game (1). A chance for you to test your knowledge of Switzerland and win prizes.
- 0115 USA, WGTG McCaysville GA: Pastor Norman Marks. A quarter-hour of talk and music from the New Bible Church.
- 0133 Germany, Deutsche Welle: Inside Europe. A radio magazine offering a European perspective on events of the week.

Mondays

- 0100 USA, WEWN Birmingham AL: Mother Angelica Live (encore). See S 0100.
- 0100 Germany, Deutsche Welle: News. See S 0100.
- 0100 Switzerland, Swiss R Intl: News. See S 0100.
- 0100 USA, WGTG McCaysville GA: Missions in Focus. Conversations with the people who are the missionaries to the world.
- 0105 Switzerland, Swiss R Intl: Newsnet. See S 0105.
- 0106 Germany, Deutsche Welle: Mailbag. See S 0233.
- 0130 USA, WGTG McCaysville GA: Word of Life (Spanish). No information available.
- 0133 Germany, Deutsche Welle: Arts on the Air. See S 1618.

- 0133 Germany, Deutsche Welle: Feature of the Month (1). See S 1618.

Tuesdays

- 0100 USA, WEWN Birmingham AL: Pillars of Faith (live). Bishop D. Foley takes telephone questions about Catholic doctrine.
- 0100 Germany, Deutsche Welle: News. See S 0100.
- 0100 Switzerland, Swiss R Intl: News. See S 0100.
- 0100 USA, WGTG McCaysville GA: Viewpoint on the Home. The bible's view of family relationships.
- 0105 Switzerland, Swiss R Intl: Newsnet. See S 0105.
- 0106 Germany, Deutsche Welle: NewsLink. See M 1106.
- 0115 USA, WGTG McCaysville GA: Fisherman's 5-Minute Look at the Book. A brief examination of Bible scripture.
- 0133 Germany, Deutsche Welle: Man and Environment. Various topics relating to the environment in industrial and developing countries.
- 0135 USA, WGTG McCaysville GA: Moments for Missions. Evangelizing for the missions to the world.

Wednesdays

- 0100 USA, WEWN Birmingham AL: Mother Angelica Live Family Night. A simulcast of the TV program.
- 0100 Germany, Deutsche Welle: News. See S 0100.
- 0100 Switzerland, Swiss R Intl: News. See S 0100.
- 0100 USA, WGTG McCaysville GA: Viewpoint on the Home. See T 0100.
- 0105 Switzerland, Swiss R Intl: Newsnet. See S 0105.
- 0106 Germany, Deutsche Welle: NewsLink. See M 1106.
- 0115 USA, WGTG McCaysville GA: Fisherman's 5-Minute Look at the Book. See T 0115.
- 0133 Germany, Deutsche Welle: Insight. A weekly analysis of major developments on the international scene.
- 0135 USA, WGTG McCaysville GA: Moments for Missions. See T 0135.

Thursdays

- 0100 USA, WEWN Birmingham AL: Mother Angelica Live. See S 0100.
- 0100 Germany, Deutsche Welle: News. See S 0100.
- 0100 Switzerland, Swiss R Intl: News. See S 0100.
- 0100 USA, WGTG McCaysville GA: Viewpoint on the Home. See T 0135.

- 0100 Switzerland, Swiss R Intl: Newsnet. See S 0105.
- 0106 Germany, Deutsche Welle: NewsLink. See M 1106.
- 0115 USA, WGTG McCaysville GA: Fisherman's 5-Minute Look at the Book. See T 0115.
- 0133 Germany, Deutsche Welle: Living in Germany. A weekly look at the social and political issues in the 1990s.
- 0135 USA, WGTG McCaysville GA: Moments for Missions. See T 0135.

Fridays

- 0100 USA, WEWN Birmingham AL: Life on the Rock (live). See S 1500.
- 0100 Germany, Deutsche Welle: News. See S 0100.
- 0100 Switzerland, Swiss R Intl: News. See S 0100.
- 0100 USA, WGTG McCaysville GA: Viewpoint on the Home. See T 0100.
- 0105 Switzerland, Swiss R Intl: Newsnet. See S 0105.
- 0106 Germany, Deutsche Welle: NewsLink. See M 1106.
- 0115 USA, WGTG McCaysville GA: Fisherman's 5-Minute Look at the Book. See T 0115.
- 0133 Germany, Deutsche Welle: Spotlight on Sport. Weekly magazine program with background stories and coverage of important events.
- 0135 USA, WGTG McCaysville GA: Moments for Missions. See T 0135.

Saturdays

- 0100 USA, WEWN Birmingham AL: The Journey Home (live). A call-in show that examines why so many people are being drawn home to the Catholic Church.
- 0100 Germany, Deutsche Welle: News. See S 0100.
- 0100 Switzerland, Swiss R Intl: News. See S 0100.
- 0100 USA, WGTG McCaysville GA: Viewpoint on the Home. See T 0100.
- 0105 Switzerland, Swiss R Intl: Newsnet. See S 0105.
- 0106 Germany, Deutsche Welle: NewsLink. See M 1106.
- 0115 USA, WGTG McCaysville GA: Fisherman's 5-Minute Look at the Book. See T 0115.
- 0133 Germany, Deutsche Welle: German by Radio. An advanced German language course for English speakers.
- 0135 USA, WGTG McCaysville GA: Moments for Missions. See T 0135.

FREQUENCIES

0200-0300	Anguilla, Caribbean Beacon	6090am				0200-0300	Taiwan, VO Free China	5950na	7130as	9680na	11740ca
0200-0300 twhfa	Argentina, RAE	11710am						11825as	15345as		
0200-0300	Australia, Radio	9660pa	12080pa	13605pa	15240pa	0200-0300	United Kingdom, BBC WS	5970sa	5975am	6135af	6175am
		15415as	15510pa	17750as	17795pa			6195eu	9410va	9605as	11955as
								15280as	15310as	15360as	
0200-0300 vl	Australia, VL8K Katherine	5025do				0200-0230	United Kingdom, BBC WS	9590am	9915am		
0200-0300 vl	Australia, VL8T Tent Crk	4910do				0200-0300	United Kingdom, UCB	6200eu			
0200-0210	Bangladesh, Bangla Betar	4880do				0200-0300	USA, KAIJ Dallas TX	5810am			
0200-0300	Canada, CBC N Quebec Svc	9625do				0200-0300	USA, KJES Mesquite NM	7555na			
0200-0300	Canada, CFRX Toronto	6070do				0200-0300	USA, KTVN Salt Lk City UT	7510am			
0200-0300	Canada, CFVP Calgary	6030do				0200-0300	USA, KWHR Naalehu HI	17555pa			
0200-0300	Canada, CHNX Halifax	6130do				0200-0300	USA, Monitor Radio Intl	5850na	7535na		
0200-0300	Canada, CKZN St John's	6160do				0200-0300	USA, Voice of America	7115as	7205as	9635as	11705as
0200-0300	Canada, CKZU Vancouver	6160do						11725as	15170as	15250as	17740as
0200-0300	Canada, R Canada Intl	9755na	13670na					17820as			
0200-0300 sm	Canada, R Canada Intl	6120am	9535am	11715am		0200-0300	USA, WEWN Birmingham AL	5825eu			
0200-0300	Costa Rica, RF Peace Intl	7385am	7585am	15050am		0200-0300	USA, WGTG McCaysville GA	5085am			
0200-0300	Cuba, Radio Havana	6000na	9820na	9830na		0200-0300	USA, WHRI Noblesville IN	5745am	7315am		
0200-0300	Ecuador, HCJB	9745am	21455am			0200-0300	USA, WINB Red Lion PA	11950am			
0200-0300	Egypt, Radio Cairo	9475na				0200-0300	USA, WJCR Upton KY	7490na			
0200-0250	Germany, Deutsche Welle	7285as	7355as	9615as	9690as	0200-0300	USA, WRMI/R Miami Intl	9955am			
		11965as	12045as			0200-0300	USA, WRNO New Orleans LA	7355am			
0200-0230	Hungary, Radio Budapest	6120na	9580na			0200-0300	USA, WWCR Nashville TN	3215am	5070am	7435am	13845am
0200-0300 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do		0200-0300	USA, WYFR Okeechobee FL	6065na	9505na		
0200-0300	Lebanon, Voice of Hope	9960va				0215-0225	Nepal, Radio	5005do	7165do		
0200-0300 smtwh	Malaysia, Radio	7295do				0230-0300	Albania, R Tirana Intl	6140na	7160na		
0200-0300 s	Malta, VO Mediterranean	15550au	17570as			0230-0259	Austria, R Austria Intl	9655na	9870sa	13730sa	
0200-0230	Netherlands, Radio	5905as	7305as	9855as		0230-0300	Netherlands, Radio	9855as	11655as		
0200-0300	New Zealand, R NZ Intl	15115pa				0230-0245	Pakistan, Radio	7255as	7270as	15120as	15485as
0200-0230 m	Norway, Radio Norway Intl	7465na	9560na					17705as			
0200-0300 vl	Papua New Guinea, NBC	9675do				0230-0300 vl/m-a	Philippines, R Pilipinas	11885me	15120me	15270me	
0200-0300	Philippines, FEBC/R Intl	15450as				0230-0300	Sweden, Radio	7135na			
0200-0256	Romania, R Romania Intl	5990na	6155na	9510na	9570na	0230-0300	United Kingdom, BBC WS	7325am	9895am		
		11940na	12990na			0230-0256	Vietnam, Voice of	5940na			
0200-0300	Russia, Voice of Russia WS	7105na	12010na	12050na	13665na	0230-0300 vl	Zambia, R Zambia/ZNBC 2	6165do			
		15180na	15595na			0245-0300	India, All India Radio	6045do	7110do	11830do	15135do
0200-0300 vl	Solomon Islands, SIBC	5020do				0250-0300 sf	Greece, Voice of	6260na	7450na	9420na	9935na
0200-0300	South Korea, R Korea Intl	7275as	11725am	11810am	15575am	0250-0300	Vatican State, Vatican R	7305ca	9605am		
0200-0300	Sri Lanka, Sri Lanka BC	9730as				0255-0300 vl	Zambia, R Zambia/ZNBC 1	4910do			

SELECTED PROGRAMS

Sundays

- 0200 USA, WEWN Birmingham AL: St. Joseph Radio Presents (encore). A discussion of Catholic beliefs and practices for all denominations.
- 0200 Germany, Deutsche Welle: News. See S 0100.
- 0200 Russia, Voice of: News. Every hour on the hour.
- 0200 USA, WGTG McCaysville GA: USA Radio News. World news from the USA Radio Network.
- 0206 Germany, Deutsche Welle: Saturday Review. See S 0106.
- 0211 Russia, Voice of: Music and Musicians. World-famous performers and composers play for you.
- 0220 USA, WGTG McCaysville GA: Music. See S 0000.
- 0233 Germany, Deutsche Welle: Mailbag. Listener mail from the Americas is answered.

Mondays

- 0200 USA, WEWN Birmingham AL: The Sacraments. Father Giles Dimock teaches what the sacraments are and practical ways that every Catholic can live them.
- 0200 Germany, Deutsche Welle: News. See S 0100.
- 0200 Russia, Voice of: News. See S 0200.
- 0200 USA, WGTG McCaysville GA: USA Radio News. See S 0200.
- 0205 USA, WGTG McCaysville GA: What Does the Bible Say? A sermon from the Fundamental Bible Church of Los Osos, California.
- 0206 Germany, Deutsche Welle: Sunday Review. See S 0106.
- 0211 Russia, Voice of: Music and Musicians. See S 0211.
- 0233 Germany, Deutsche Welle: Marks and Markets. NEW! Germany's role in world trade.
- 0235 USA, WGTG McCaysville GA: Music. See S 0000.

Tuesdays

- 0200 USA, WEWN Birmingham AL: Truth Talks: Deal Hudson of Crisis Magazine and his guests discuss relevant issues, including ethics, charity and democracy.
- 0200 Germany, Deutsche Welle: News. See S 0100.
- 0200 Russia, Voice of: News. See S 0200.
- 0200 USA, WGTG McCaysville GA: USA Radio News. See S 0200.
- 0204 USA, WGTG McCaysville GA: Variable Programming. A program featuring a 45-minute talk by different religious figures each night.
- 0206 Germany, Deutsche Welle: NewsLink. See M 1106.
- 0211 Russia, Voice of: Commonwealth Update. Comments on the

latest developments in the CIS, in-depth analysis of current events, and major issues of home policies.

- 0230 Russia, Voice of: News in Brief. See S 1430.
- 0232 Russia, Voice of: Folk Box. See M 1532.
- 0233 Germany, Deutsche Welle: Man and Environment. See T 0133.

Wednesdays

- 0200 USA, WEWN Birmingham AL: St. Joseph Radio Presents (encore). See S 0200.
- 0200 Germany, Deutsche Welle: News. See S 0100.
- 0200 Russia, Voice of: News. See S 0200.
- 0200 USA, WGTG McCaysville GA: USA Radio News. See S 0200.
- 0204 USA, WGTG McCaysville GA: Variable Programming. See T 0204.
- 0206 Germany, Deutsche Welle: NewsLink. See M 1106.
- 0211 Russia, Voice of: Commonwealth Update. See T 0211.
- 0230 Russia, Voice of: News in Brief. See S 1430.
- 0232 Russia, Voice of: Music at Your Request. Music as requested by listeners.
- 0233 Germany, Deutsche Welle: Insight. See W 0133.
- 0255 USA, WEWN Birmingham AL: Today's Saint. See S 1255.

Thursdays

- 0200 USA, WEWN Birmingham AL: LiveWire (live). Live call-in program.
- 0200 Germany, Deutsche Welle: News. See S 0100.
- 0200 Russia, Voice of: News. See S 0200.
- 0200 USA, WGTG McCaysville GA: USA Radio News. See S 0200.
- 0204 USA, WGTG McCaysville GA: Variable Programming. See T 0204.
- 0206 Germany, Deutsche Welle: NewsLink. See M 1106.
- 0211 Russia, Voice of: Commonwealth Update. See T 0211.
- 0230 Russia, Voice of: News in Brief. See S 1430.
- 0232 Russia, Voice of: The Jazz Show. See W 1532.
- 0233 Germany, Deutsche Welle: Living in Germany. See H 0133.
- 0255 USA, WEWN Birmingham AL: Today's Saint. See S 1255.

Fridays

- 0200 USA, WEWN Birmingham AL: St. Joseph Radio Presents (encore). See S 0200.

- 0200 Germany, Deutsche Welle: News. See S 0100.
- 0200 Russia, Voice of: News. See S 0200.
- 0200 USA, WGTG McCaysville GA: USA Radio News. See S 0200.
- 0204 USA, WGTG McCaysville GA: Variable Programming. See T 0204.
- 0206 Germany, Deutsche Welle: NewsLink. See M 1106.
- 0211 Russia, Voice of: Commonwealth Update. See T 0211.
- 0230 Russia, Voice of: News in Brief. See S 1430.
- 0232 Russia, Voice of: Music at Your Request. See W 0232.
- 0233 Germany, Deutsche Welle: Spotlight on Sport. See F 0133.
- 0255 USA, WEWN Birmingham AL: Today's Saint. See S 1255.

Saturdays

- 0200 USA, WEWN Birmingham AL: The World Over. See S 0028.
- 0200 Germany, Deutsche Welle: News. See S 0100.
- 0200 Russia, Voice of: News. See S 0200.
- 0200 USA, WGTG McCaysville GA: USA Radio News. See S 0200.
- 0204 USA, WGTG McCaysville GA: Variable Programming. See T 0204.
- 0206 Germany, Deutsche Welle: NewsLink. See M 1106.
- 0211 Russia, Voice of: Commonwealth Update. See T 0211.
- 0230 USA, WEWN Birmingham AL: Pro-Life Update. See W 0000.
- 0230 Russia, Voice of: News in Brief. See S 1430.
- 0232 Russia, Voice of: The Jazz Show. See W 1532.
- 0233 Germany, Deutsche Welle: German by Radio. See A 0133.

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FREQUENCIES

0400-0500	Anguilla, Caribbean Beacon	6090am				0400-0500	United Kingdom, BBC WS	3255af	3955eu	5975af	6005af
0400-0500	Australia, Radio	9660pa	12080pa	13605as	15240pa			6175am	6180eu	6190af	6195eu
		15510pa	17795pa					7160af	9410na	9600af	11760va
0400-0500 s	Australia, Radio	15415as	17750as					11955as	12085af	12095va	15280as
0400-0500 vl	Australia, VL8K Katherine	5025do						15310as	15575va	17640af	17790as
0400-0500 vl	Australia, VL8T Tent Crk	4910do				0400-0430	United Kingdom, BBC WS	9605as	9610af	9895am	11730af
0400-0500	Australia, Defense Forces R	13525as				0400-0500	United Kingdom, UCB	6200eu			
0400-0500	Canada, CBC N Quebec Svc	9625do				0400-0500	USA, KAIJ Dallas TX	5810am			
0400-0500	Canada, CFRX Toronto	6070do				0400-0500	USA, KTVN Salt Lk City UT	7510am			
0400-0500	Canada, CFVP Calgary	6030do				0400-0500	USA, KVOH Los Angeles CA	9975am			
0400-0500	Canada, CHNX Halifax	6130do				0400-0500	USA, KWHR Naalehu HI	17555pa			
0400-0500	Canada, CKZN St John's	6160do				0400-0500	USA, Monitor Radio Intl	7535eu	9840af		
0400-0500	Canada, CKZU Vancouver	6160do				0400-0500	USA, Voice of America	6080af	7170af	7265af	7280af
0400-0430	Canada, R Canada Intl	9715me	11835me	15275me				7290af	9575af	9885af	11965me
0400-0500	China, China Radio Intl	9560na	9730am					15205va			
0400-0500	Costa Rica, RF Peace Intl	7385am	7585am	15050am		0400-0500	USA, WEWN Birmingham AL	5825eu			
0400-0500	Cuba, Radio Havana	6000na	9820na	9830na		0400-0500	USA, WGTG McCaysville GA	5085am			
0400-0500	Ecuador, HCJB	9745am	21455am			0400-0500	USA, WHRI Noblesville IN	5745am	7315am		
0400-0450	Germany, Deutsche Welle	5990af	6015af	7225af	9565af	0400-0500	USA, WINB Red Lion PA	11950am			
		11765af				0400-0500	USA, WJCR Upton KY	7490na			
0400-0500 twhta	Guatemala, Radio Cultural	3300do				0400-0500 smtwhf	USA, WMLK Bethel PA	9465va			
0400-0500 m	Honduras, LV Evangelica	4820do				0400-0500	USA, WRMI/R Miami Intl	9955am			
0400-0500 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do		0400-0500	USA, WRNO New Orleans LA	7355am	7395am		
0400-0500	Lebanon, Voice of Hope	9960va				0400-0500	USA, WWCR Nashville TN	3215am	5070am	5935am	7435am
0400-0500 s	Malta, VO Mediterranean	15550as	17570au			0400-0500	USA, WYFR Okeechobee FL	6065na	9505na	9985eu	
0400-0430 mtwhfa	Mexico, Radio Mexico Intl	9705na				0400-0430	Vietnam, Voice of	12020na	15010na		
0400-0458	New Zealand, R NZ Intl	15115pa				0400-0500	Zambia, Christian Voice	3330af	6065af		
0400-0430 m	Norway, Radio Norway Intl	7520na				0400-0500 vl	Zambia, R Zambia/ZNBC 1	4910do			
0400-0500 vl	Papua New Guinea, NBC	9675do				0400-0500 vl	Zambia, R Zambia/ZNBC 2	6165do			
0400-0456	Romania, R Romania Intl	5990na	6155na	9510na	9570na	0400-0500 vl	Zimbabwe, Zimbabwe BC	3396do			
		11940na	12990na			0415-0500 vl	Malawi, MBC	5993do			
0400-0500	Russia, Voice of Russia WS	7125na	7270na	7345na	9825na	0425-0440 vl	Italy, RAI Intl	5975eu	7270eu		
		9895na	12060na	13790na	15455na	0425-0500	Nigeria, FRCN/Radio	3326do	4770do	4990do	
0400-0430	S Africa, Channel Africa	5955af				0430-0459	Austria, R Austria Intl	6155eu	13730eu		
0400-0430	Slovakia, AWR Europe	9465af				0430-0500 m-t/vl	Lesotho, Radio Lesotho	4800do			
0400-0500 vl	Solomon Islands, SIBC	5020do				0430-0455	Moldova, R Moldova Intl	7520na			
0400-0430	Sri Lanka, Sri Lanka BC	9730as				0430-0500	Netherlands, Radio	6165na	9590na		
0400-0430	Switzerland, Swiss R Intl	6135na	9885na			0430-0500	Swaziland, Trans World R	3200af	4775af	6100af	
0400-0430	Tanzania, Radio	5050af				0430-0500	Switzerland, Swiss R Intl	9905ca			
0400-0500	Turkey, Voice of	7270as	7300eu	15190au		0430-0500	United Kingdom, BBC WS	15420af			
0400-0415	Uganda, Radio	4976do				0455-0500	Malaysia, Voice of	6175as	9750as	15295au	
0400-0500	Ukraine, R Ukraine Intl	6020na	7150na	9550na	12040na	0459-0500	New Zealand, R NZ Intl	9795pa			

SELECTED PROGRAMS

Sundays

- 0400 USA, WEWN Birmingham AL: The Holy Rosary with Father Scallion. Divine worship.
- 0400 Germany, Deutsche Welle: News. See S 0100.
- 0400 Switzerland, Swiss R Intl: News. See S 0100.
- 0400 USA, WGTG: USA Radio News. See S 0200.
- 0405 Switzerland, Swiss R Intl: Newsnet. See S 0105.
- 0406 Germany, Deutsche Welle: Saturday Review. See S 0106.
- 0415 Switzerland, Swiss R Intl: Capital Letters (2/4). See S 0115.
- 0415 Switzerland, Swiss R Intl: Sounds Good (3/5). See S 0115.
- 0415 Switzerland, Swiss R Intl: The Name Game (1). See S 0115.
- 0430 USA, WEWN Birmingham AL: Winners for Christ. Father Cohen explores principles for victorious living.
- 0430 Switzerland, Swiss R Intl: Rendez-vous with Switzerland. A relaxing blend of music and interviews.
- 0433 Germany, Deutsche Welle: Inside Europe. See S 0133.

Mondays

- 0400 USA, WEWN Birmingham AL: The Holy Rosary with Father Scallion. See S 0400.
- 0400 Germany, Deutsche Welle: News. See S 0100.
- 0400 Switzerland, Swiss R Intl: News. See S 0100.
- 0400 USA, WGTG: USA Radio News. See S 0200.
- 0405 Switzerland, Swiss R Intl: Newsnet. See S 0105.
- 0405 USA, WGTG McCaysville GA: The Bible in Living Sound. A half-hour dramatized story from the Bible.
- 0406 Germany, Deutsche Welle: Sunday Review. See S 0106.
- 0430 USA, WEWN Birmingham AL: Voyage of Faith. See S 1600.
- 0430 Switzerland, Swiss R Intl: Rendez-vous with Switzerland. See S 0430.
- 0433 Germany, Deutsche Welle: Marks and Markets. See M 0233.
- 0446 Switzerland, Swiss R Intl: Capital Letters (2/4). See S 0115.

Tuesdays

- 0400 USA, WEWN Birmingham AL: The Holy Rosary with Father

Scallion. See S 0400.

- 0400 Germany, Deutsche Welle: News. See S 0100.
- 0400 Switzerland, Swiss R Intl: News. See S 0100.
- 0400 USA, WGTG McCaysville GA: USA Radio News. See S 0200.
- 0405 Switzerland, Swiss R Intl: Newsnet. See S 0105.
- 0406 Germany, Deutsche Welle: NewsLink. See M 1106.
- 0428 USA, WEWN Birmingham AL: Stations of the Cross. Praying the fourteen stations.
- 0430 Switzerland, Swiss R Intl: Rendez-vous with Switzerland. See S 0430.
- 0430 USA, WGTG McCaysville GA: Prophecy for Today. See M 1304.
- 0433 Germany, Deutsche Welle: Good Morning Africa. Music, gossip and listeners' messages for and from Africa.

Wednesdays

- 0400 USA, WEWN Birmingham AL: The Holy Rosary with Father Scallion. See S 0400.
- 0400 Germany, Deutsche Welle: News. See S 0100.
- 0400 Switzerland, Swiss R Intl: News. See S 0100.
- 0400 USA, WGTG McCaysville GA: USA Radio News. See S 0200.
- 0405 Switzerland, Swiss R Intl: Newsnet. See S 0105.
- 0406 Germany, Deutsche Welle: NewsLink. See M 1106.
- 0428 USA, WEWN Birmingham AL: Stations of the Cross. See T 0428.
- 0430 Switzerland, Swiss R Intl: Rendez-vous with Switzerland. See S 0430.
- 0430 USA, WGTG McCaysville GA: Prophecy for Today. See M 1304.
- 0433 Germany, Deutsche Welle: Good Morning Africa. See T 0433.

Thursdays

- 0400 USA, WEWN Birmingham AL: The Holy Rosary with Father Scallion. See S 0400.
- 0400 Germany, Deutsche Welle: News. See S 0100.
- 0400 Switzerland, Swiss R Intl: News. See S 0100.
- 0400 USA, WGTG McCaysville GA: USA Radio News. See S 0200.
- 0405 Switzerland, Swiss R Intl: Newsnet. See S 0105.
- 0406 Germany, Deutsche Welle: NewsLink. See M 1106.
- 0428 USA, WEWN Birmingham AL: Stations of the Cross. See T 0428.
- 0430 Switzerland, Swiss R Intl: Rendez-vous with Switzerland. See

S 0430.

- 0430 USA, WGTG McCaysville GA: Prophecy for Today. See M 1304.
- 0433 Germany, Deutsche Welle: Good Morning Africa. See T 0433.

Fridays

- 0400 USA, WEWN Birmingham AL: The Holy Rosary with Father Scallion. See S 0400.
- 0400 Germany, Deutsche Welle: News. See S 0100.
- 0400 Switzerland, Swiss R Intl: News. See S 0100.
- 0400 USA, WGTG McCaysville GA: USA Radio News. See S 0200.
- 0405 Switzerland, Swiss R Intl: Newsnet. See S 0105.
- 0406 Germany, Deutsche Welle: NewsLink. See M 1106.
- 0428 USA, WEWN Birmingham AL: Stations of the Cross. See T 0428.
- 0430 Switzerland, Swiss R Intl: Rendez-vous with Switzerland. See S 0430.
- 0430 USA, WGTG McCaysville GA: Prophecy for Today. See M 1304.
- 0433 Germany, Deutsche Welle: Good Morning Africa. See T 0433.

Saturdays

- 0400 USA, WEWN Birmingham AL: The Holy Rosary with Father Scallion. See S 0400.
- 0400 Germany, Deutsche Welle: News. See S 0100.
- 0400 Switzerland, Swiss R Intl: News. See S 0100.
- 0400 USA, WGTG McCaysville GA: USA Radio News. See S 0200.
- 0405 Switzerland, Swiss R Intl: Newsnet. See S 0105.
- 0406 Germany, Deutsche Welle: NewsLink. See M 1106.
- 0428 USA, WEWN Birmingham AL: Stations of the Cross. See T 0428.
- 0430 Switzerland, Swiss R Intl: Rendez-vous with Switzerland. See S 0430.
- 0430 USA, WGTG McCaysville GA: Prophecy for Today. See M 1304.
- 0433 Germany, Deutsche Welle: German by Radio. See A 0133.

FREQUENCIES

0500-0600	Anguilla, Caribbean Beacon	6090am				0500-0530	Switzerland, Swiss R Intl	6165eu	9335eu		
0500-0600	Australia, Radio	12080pa	13605as	15240pa	15510as	0500-0600	Turkey, Voice of	7340na			
		17795pa				0500-0515	Uganda, Radio	4976do			
0500-0600 vl	Australia, VL8K Katherine	5025do				0500-0600	United Kingdom, BBC WS	3255af	3955eu	5975am	6005af
0500-0600 vl	Australia, VL8T Tent Crk	4910do						6175am	6180eu	6190af	6195va
0500-0600	Australia, Defense Forces R	13525as						7120va	7160af	9410va	9600af
0500-0500	Bulgaria, Radio	9485na	11720na					9610af	9740as	11760as	11940af
0500-0600 vl	Cameroon, Radio Cameroon	4850do						12095as	15310as	15360as	15420af
0500-0600	Canada, CFRX Toronto	6070do						15575va	17640af	17760as	17885af
0500-0600	Canada, CFPV Calgary	6030do						21660as			
0500-0600	Canada, CHNX Halifax	6130do				0500-0530	United Kingdom, BBC WS	15280as	17790as		
0500-0600	Canada, CKZU Vancouver	6160do				0500-0600	United Kingdom, UCB	6200eu			
0500-0600	Costa Rica, Adv World R	5030ca	6150ca	9725ca		0500-0600	USA, KAIJ Dallas TX	5810am			
0500-0600 as	Costa Rica, Adv World R	7375am				0500-0600	USA, KTNB Salt Lk City UT	7510am			
0500-0600	Costa Rica, RF Peace Intl	7385am	7585am	15050am		0500-0600	USA, KVOH Los Angeles CA	9975am			
0500-0600	Cuba, Radio Havana	9820na	9830na			0500-0600	USA, KWHR Naalehu HI	17555pa			
0500-0600 vl	Cyprus, BRT International	6150do				0500-0600	USA, Monitor Radio Intl	7535eu			
0500-0600	Ecuador, HCJB	9745am	21455am			0500-0600	USA, Voice of America	5970af	6035af	6080af	7170va
0500-0550	Germany, Deutsche Welle	5960na	6045na	6120na	6145na			7195af	9630af	11965me	12080af
		6185na	9615na					13740af	15205va		
0500-0600	Guyana, GBC/Voice of	3290do				0500-0600	USA, WEWN Birmingham AL	5825eu			
0500-0515	Israel, Kol Israel	7465na	9435na			0500-0600	USA, WGTG McCaysville GA	5085am			
0500-0600	Japan, R Japan/NHK World	6110na	7230eu	11840as	11895eu	0500-0600	USA, WHRI Noblesville IN	5745am	7315am		
		11920na				0500-0600	USA, WINB Red Lion PA	11950am			
0500-0530	Japan, R Japan/NHK World	13630na	15230na			0500-0600	USA, WJCR Upton KY	7490na			
0500-0600 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do		0500-0600 smtwhf	USA, WMLK Bethel PA	9465va			
0500-0600 vl	Kiribati, Radio	9810do				0500-0600	USA, WRMI/R Miami Intl	9955am			
0500-0600	Lebanon, Voice of Hope	9960va				0500-0600	USA, WRNO New Orleans LA	7395am			
0500-0505	Lesotho, Radio Lesotho	4800do				0500-0600	USA, WWCR Nashville TN	3210am	5070am	5935am	7435am
0500-0600	Liberia, LCN/R Liberia Intl	5100do				0500-0600	USA, WYFR Okeechobee FL	5985na	9985af	11580eu	
0500-0510 mtwhf	Malawi, MBC	3380do				0500-0520	Vatican State, Vatican R	5885eu	7250eu	9660af	11625af
0500-0530 mtwhf	Mexico, Radio Mexico Intl	9705na						15570af			
0500-0525	Netherlands, Radio	6165na	9590na			0500-0600	Zambia, Christian Voice	3330af	6065af		
0500-0600	New Zealand, R NZ Intl	9795pa				0500-0530 vl	Zambia, R Zambia/ZNBC 1	4910do			
0500-0505	Nigeria, FRON/Radio	3326do	4770do	4990do		0500-0600 vl	Zambia, R Zambia/ZNBC 2	6165do			
0500-0600	Nigeria, Voice of	7255af				0500-0530 vl	Zimbabwe, Zimbabwe BC	3396do			
0500-0557	North Korea, R Pyongyang	11740as	13790as			0505-0600	Swaziland, Trans World R	9500af			
0500-0510	Pakistan, Radio	7270as				0520-0530	Vatican State, Vatican R	9660af	11625af	15570af	
0500-0600 vl	Papua New Guinea, NBC	9675do				0525-0600	Ghana, Ghana Broadc Corp	3366do	4915do		
0500-0600	Russia, Voice of Russia WS	7125na	7270na	7345na	9825na	0530-0559	Austria, R Austria Intl	6205na			
		9895na	12060na			0530-0556	Romania, R Romania Intl	11790af	11940af	15250af	15270af
0500-0530	S Africa, Channel Africa	9675af						15340as	17720as	17790af	
0500-0600 vl	Solomon Islands, SIBC	5020do				0530-0600	Serbia, R Yugoslavia	9580na	11870na		
0500-0556	Spain, R Exterior Espana	6055am				0530-0600	Thailand, Radio	9655eu	11905eu	15115eu	
0500-0630	Swaziland, Trans World R	4775af	6100af			0530-0600 vl	Zambia, R Zambia/ZNBC 1	7220do			
						0530-0600 vl	Zimbabwe, Zimbabwe BC	5975do			

SELECTED PROGRAMS

Sundays

- 0500 USA, WEWN Birmingham AL: Retreat Teachings. Father Groeschel hosts this series.
- 0500 Germany, Deutsche Welle: News. See S 0100.
- 0500 Spain, R Exterior de Espana: News. See S 0000.
- 0500 USA, WGTG McCaysville GA: Contending for the Faith. Spiritual insight about important topics.
- 0506 Germany, Deutsche Welle: Saturday Review. See S 0106.
- 0511 Spain, R Exterior de Espana: Cultural Encounters. See S 0011.
- 0520 Spain, R Exterior de Espana: Distance Unknown. See S 0020.
- 0533 Germany, Deutsche Welle: Inside Europe. See S 0133.
- 0536 Spain, R Exterior de Espana: Spanish Poparama. See S 0036.

Mondays

- 0500 USA, WEWN Birmingham AL: Spanish Mass (encore). Catholic Mass in Spanish.
- 0500 Germany, Deutsche Welle: News. See S 0100.
- 0500 Spain, R Exterior de Espana: News. See S 0000.
- 0500 USA, WGTG McCaysville GA: Phillip Allen Lee. Brother Lee evangelizes from Salisbury, Maryland.
- 0506 Germany, Deutsche Welle: Mailbag. See S 0233.
- 0510 Spain, R Exterior de Espana: Visitors Book. See M 0011.
- 0518 Germany, Deutsche Welle: COOL. See S 1118.
- 0522 Spain, R Exterior de Espana: Spanish Echoes. See M 0022.
- 0538 Spain, R Exterior de Espana: Radio Club. See M 0038.

Tuesdays

- 0500 USA, WEWN Birmingham AL: The Sacraments. See M 0200.
- 0500 Germany, Deutsche Welle: News. See S 0100.
- 0500 Spain, R Exterior de Espana: The News from Spain. See T 0000.
- 0506 Germany, Deutsche Welle: NewsLink. See M 1106.
- 0530 Spain, R Exterior de Espana: Spanish Music. See T 0030.
- 0530 USA, WGTG McCaysville GA: Faith Mountain Ministries. Brother Henry Venderbush evangelizes to the farmers of America.

- 0533 Germany, Deutsche Welle: Man and Environment. See T 0133.
- 0536 Spain, R Exterior de Espana: Press Review. See T 0036.
- 0541 Spain, R Exterior de Espana: Entertainment in Spain. See T 0041.
- 0551 Spain, R Exterior de Espana: Spanish Course by Radio. See T 0051.

Wednesdays

- 0500 USA, WEWN Birmingham AL: The Abundant Life. Johnnette Benkovic with challenging subjects dealing with improving family life.
- 0500 Germany, Deutsche Welle: News. See S 0100.
- 0500 Spain, R Exterior de Espana: The News from Spain. See T 0000.
- 0500 USA, WGTG McCaysville GA: The Gethsemane Hour. The voice of the Anabaptists from Lexington, South Carolina.
- 0506 Germany, Deutsche Welle: NewsLink. See M 1106.
- 0530 Spain, R Exterior de Espana: Spanish Music. See T 0030.
- 0530 USA, WGTG McCaysville GA: Biblical Studies Institute. Bob Tref evangelizes from Rapid City, South Dakota.
- 0533 Germany, Deutsche Welle: Insight. See W 0133.
- 0534 Spain, R Exterior de Espana: Press Review. See T 0036.
- 0539 Spain, R Exterior de Espana: Kaleidoscope. See W 0039.
- 0547 Spain, R Exterior de Espana: Spanish Course by Radio. See T 0051.

Thursdays

- 0500 USA, WEWN Birmingham AL: Mother Angelica Live (encore). See S 0100.
- 0500 Germany, Deutsche Welle: News. See S 0100.
- 0500 Spain, R Exterior de Espana: The News from Spain. See T 0000.
- 0500 USA, WGTG McCaysville GA: Phillip Alan Lee. Evangelizing from Salisbury, Maryland.
- 0506 Germany, Deutsche Welle: NewsLink. See M 1106.
- 0530 Spain, R Exterior de Espana: Spanish Music. See T 0030.
- 0533 Germany, Deutsche Welle: Living in Germany. See H 0133.

- 0534 Spain, R Exterior de Espana: Press Review. See T 0036.
- 0539 Spain, R Exterior de Espana: Window on Spain. See H 0039.
- 0549 Spain, R Exterior de Espana: Spanish Course by Radio. See T 0051.

Fridays

- 0500 USA, WEWN Birmingham AL: Mother Angelica Live (encore). See S 0100.
- 0500 Germany, Deutsche Welle: News. See S 0100.
- 0500 Spain, R Exterior de Espana: The News from Spain. See T 0000.
- 0500 USA, WGTG McCaysville GA: The Gethsemane Hour. See W 0500.
- 0506 Germany, Deutsche Welle: NewsLink. See M 1106.
- 0530 Spain, R Exterior de Espana: Press Review. See T 0036.
- 0533 Germany, Deutsche Welle: Spotlight on Sport. See F 0133.
- 0536 Spain, R Exterior de Espana: Radio Club. See M 0038.
- 0548 Spain, R Exterior de Espana: Spanish Course by Radio. See T 0051.

Saturdays

- 0500 USA, WEWN Birmingham AL: Pillars of Faith (encore). See T 0100.
- 0500 Germany, Deutsche Welle: News. See S 0100.
- 0500 Spain, R Exterior de Espana: The News from Spain. See T 0000.
- 0506 Germany, Deutsche Welle: NewsLink. See M 1106.
- 0530 USA, WGTG McCaysville GA: Biblical Studies Institute. See W 0530.
- 0531 Spain, R Exterior de Espana: Spanish Music. See T 0030.
- 0533 Germany, Deutsche Welle: German by Radio. See A 0133.
- 0534 Spain, R Exterior de Espana: Press Review. See T 0036.
- 0539 Spain, R Exterior de Espana: Review of the Arts. See A 0039.
- 0550 Spain, R Exterior de Espana: Spanish Course by Radio. See T 0051.

FREQUENCIES

0600-0700	Anguilla, Caribbean Beacon	6090am				0600-0700	United Kingdom, BBC WS	5975am	6005af	6175am	6180eu
0600-0700	Australia, Radio	12080pa	13605as	15240pa	15415as			6190af	6195eu	7145as	7160af
		15510as	17750as	21725as				7325va	9410va	9600af	9740as
0600-0700 vl	Australia, VL8K Katherine	5025do						11760as	11780eu	11940af	12095eu
0600-0700 vl	Australia, VL8T Tent Crk	4910do						15310as	15360as	15420af	15565va
0600-0633	Australia, Defense Forces R	13525as						15575va	17640af	17785as	17885af
0600-0700 vl	Canada, CBC N Quebec Svc	9625do				0600-0700	United Kingdom, UCB	21660as			
0600-0700	Canada, CFRX Toronto	6070do				0600-0700	USA, KAIJ Dallas TX	6200eu			
0600-0700	Canada, CFVP Calgary	6030do				0600-0700	USA, KATN Salt Lk City UT	5810am			
0600-0700	Canada, CHNX Halifax	6130do				0600-0700	USA, KVOH Los Angeles CA	7510am			
0600-0700	Canada, CKZU Vancouver	6160do				0600-0700	USA, KWHR Naalehu HI	9975am			
0600-0700	Costa Rica, RF Peace Intl	7385am	7585am			0600-0700	USA, Monitor Radio Intl	17555pa			
0600-0700	Cuba, Radio Havana	9820na	9830na			0600-0630	USA, Voice of America	7535eu			
0600-0700	Ecuador, HCJB	9745am	21455am					5970af	5995af	6035af	6080af
0600-0650	Germany, Deutsche Welle	11915af	13790af	15185af	17820as			7170va	7195af	9630af	9680eu
		17860af	21680me					11805af	11950af	11965me	12080af
		4915do						15205va			
0600-0615	Ghana, Ghana Broadc Corp	3366do				0600-0700	USA, WGTG McCaysville GA	5085am			
0600-0700	Guyana, GBC/Voice of	3290do				0600-0700	USA, WHRI Noblesville IN	5745am	7315am		
0600-0700	Japan, R Japan/NHK World	5975eu	7230eu	9835as	11740as	0600-0700	USA, WINB Red Lion PA	11950am			
		11840as	11910am	11920na	12030as	0600-0700	USA, WJCR Upton KY	7490na			
		15230na	15550va	17810as		0600-0700 smtwhf	USA, WMLK Bethel PA	9465va			
0600-0700 vl	Kenya, Kenya Broadc Corp	4885do				0600-0700	USA, WRMI/R Miami Intl	9955am			
0600-0700 vl	Kiribati, Radio	9810do				0600-0700	USA, WWCR Nashville TN	3210am	5070am	5935am	7435am
0600-0700	Lebanon, Voice of Hope	9960va				0600-0700 vl	USA, WYFR Okeechobee FL	5985am	7355eu	9985eu	
0600-0700	Liberia, LCN/R Liberia Intl	5100do				0600-0630 mtwhfa	Vatican State, Vatican R	3945do	4960do		
0600-0700	Malaysia, Voice of	6175as	9750as	15295au				5885eu	7250eu	9645eu	11740eu
0600-0700	New Zealand, R NZ Intl	9795pa						15595va			
0600-0630	Nigeria, FRCN/Radio	3326do	4770do	4990do		0600-0630	Vietnam, Voice of	5925as	10060as		
0600-0700	Nigeria, Voice of	7255af				0600-0700	Yemen, Radio Aden	9780do			
0600-0630 s	Norway, Radio Norway Intl	7180eu	7295pa	9590af	13805af	0600-0700	Zambia, Christian Voice	3330af	6065af		
0600-0700 vl	Papua New Guinea, NBC	9675do				0600-0700 vl	Zambia, R Zambia/ZNBC 1	7220do			
0600-0700	Russia, Voice of Russia WS	12000na	12010na	12040na	12050na	0600-0700 vl	Zimbabwe, Zimbabwe BC	5975do			
		13645na	13665na	15445na	15595na	0605-0700	Swaziland, Trans World R	9650af			
0600-0630	S Africa, Channel Africa	11900af				0615-0630	Switzerland, Swiss R Intl	6165eu	9535eu		
0600-0630	S Africa, Trans World R	11730af				0630-0700 vl	Italy, IRRS	3985va			
0600-0610	Sierra Leone, SLBS	3316do				0630-0645	Vatican State, Vatican R	11625af	13765af	15570af	
0600-0630	Slovakia, AWR Europe	11640af				0631-0640	Romania, R Romania Intl	9550eu	9665eu	11810eu	15365eu
0600-0700 vl	Solomon Islands, SIBC	5020do				0645-0700	Romania, R Romania Intl	11740pa	11840pa	15250pa	15270pa
0600-0700	Swaziland, Trans World R	4775af	6100af	9500af				17720pa			
0600-0630	Switzerland, Swiss R Intl	9885af	11860af	13635af							

SELECTED PROGRAMS

Sundays

- 0600 Germany, Deutsche Welle: News. See S 0100.
 0600 Russia, Voice of: News. Every hour on the hour.
 0600 Switzerland, Swiss R Intl: News. See S 0100.
 0605 Switzerland, Swiss R Intl: Newsnet. See S 0105.
 0606 Germany, Deutsche Welle: Saturday Review. See S 0106.
 0611 Russia, Voice of: Science and Engineering in the Commonwealth. The latest developments in science and technology.
 0630 Russia, Voice of: News in Brief. Ninety seconds news summary every hour on the half-hour.
 0632 Russia, Voice of: This is Russia. A program which helps you to get to know Russia, the Russians, and it's ethnic minorities better.
 0633 Germany, Deutsche Welle: Inside Europe. See S 0133.

Mondays

- 0600 Germany, Deutsche Welle: News. See S 0100.
 0600 Russia, Voice of: News. See S 0600.
 0600 Switzerland, Swiss R Intl: News. See S 0100.
 0605 Switzerland, Swiss R Intl: Newsnet. See S 0105.
 0606 Germany, Deutsche Welle: Sunday Review. See S 0106.
 0611 Russia, Voice of: Moscow Mailbag. Joe Adamov answers 15-20 listener questions every week.
 0630 Russia, Voice of: News in Brief. See S 0630.
 0632 Russia, Voice of: This is Russia. See S 0632.
 0633 Germany, Deutsche Welle: Marks and Markets. See M 0233.

Tuesdays

- 0600 Germany, Deutsche Welle: News. See S 0100.
 0600 Russia, Voice of: News. See S 0600.
 0600 Switzerland, Swiss R Intl: News. See S 0100.
 0605 Switzerland, Swiss R Intl: Newsnet. See S 0105.
 0606 Germany, Deutsche Welle: NewsLink. See M 1106.
 0611 Russia, Voice of: Focus on Asia and the Pacific. News and comments on events in the region.
 0630 Russia, Voice of: News in Brief. See S 0630.
 0632 Russia, Voice of: Moscow Yesterday and Today. Sit back and enjoy a great program about Russian history with

magnificent sound effects.

- 0633 Germany, Deutsche Welle: Good Morning Africa. See T 0433.

Wednesdays

- 0600 Germany, Deutsche Welle: News. See S 0100.
 0600 Russia, Voice of: News. See S 0600.
 0600 Switzerland, Swiss R Intl: News. See S 0100.
 0605 Switzerland, Swiss R Intl: Newsnet. See S 0105.
 0608 Germany, Deutsche Welle: NewsLink. See M 1106.
 0611 Russia, Voice of: Focus on Asia and the Pacific. See T 0611.
 0630 Russia, Voice of: News in Brief. See S 0630.
 0632 Russia, Voice of: This is Russia. See S 0632.
 0633 Germany, Deutsche Welle: Good Morning Africa. See T 0433.

Thursdays

- 0600 Germany, Deutsche Welle: News. See S 0100.
 0600 Russia, Voice of: News. See S 0600.
 0600 Switzerland, Swiss R Intl: News. See S 0100.
 0605 Switzerland, Swiss R Intl: Newsnet. See S 0105.
 0608 Germany, Deutsche Welle: NewsLink. See M 1106.
 0611 Russia, Voice of: Focus on Asia and the Pacific. See T 0611.
 0630 Russia, Voice of: News in Brief. See S 0630.
 0632 Russia, Voice of: Moscow Yesterday and Today. See T 0632.
 0633 Germany, Deutsche Welle: Good Morning Africa. See T 0433.

Fridays

- 0600 Germany, Deutsche Welle: News. See S 0100.
 0600 Russia, Voice of: News. See S 0600.
 0600 Switzerland, Swiss R Intl: News. See S 0100.
 0605 Switzerland, Swiss R Intl: Newsnet. See S 0105.
 0608 Germany, Deutsche Welle: NewsLink. See M 1106.
 0611 Russia, Voice of: Focus on Asia and the Pacific. See T 0611.
 0630 Russia, Voice of: News in Brief. See S 0630.
 0632 Russia, Voice of: This is Russia. See S 0632.
 0633 Germany, Deutsche Welle: Good Morning Africa. See T 0433.

Saturdays

- 0600 Germany, Deutsche Welle: News. See S 0100.
 0600 Russia, Voice of: News. See S 0600.
 0600 Switzerland, Swiss R Intl: News. See S 0100.

- 0600 USA, WEWN Birmingham AL: Get a Life in Christ. Father Benedict Groeschel hosts this series.
 0605 Switzerland, Swiss R Intl: Newsnet. See S 0105.
 0608 Germany, Deutsche Welle: NewsLink. See M 1106.
 0611 Russia, Voice of: Focus on Asia and the Pacific. See T 0611.
 0615 Switzerland, Swiss R Intl: Capital Letters (2/4). See S 0115.
 0615 Switzerland, Swiss R Intl: Sounds Good (3/5). See S 0115.
 0615 Switzerland, Swiss R Intl: The Name Game (1). See S 0115.
 0630 Russia, Voice of: News in Brief. See S 0630.
 0630 USA, WEWN Birmingham AL: The Gospel of Life. See M 1600.
 0632 Russia, Voice of: Moscow Yesterday and Today. See T 0632.
 0633 Germany, Deutsche Welle: German by Radio. See A 0133.

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FREQUENCIES

0700-0800	Anguilla, Caribbean Beacon	6090am			
0700-0800	Australia, Radio	9660pa	11830as	12080pa	13605as
		15240pa	15415as	15510as	17750as
0700-0800 vl	Australia, VL8K Katherine	5025do			
0700-0800 vl	Australia, VL8T Tent Crk	4910do			
0700-0800	Canada, CFRX Toronto	6070do			
0700-0800	Canada, CFVP Calgary	6030do			
0700-0800	Canada, CHNX Halifax	6130do			
0700-0800	Canada, CKZU Vancouver	6160do			
0700-0800	Costa Rica, RF Peace Intl	7385am	7585am		
0700-0727	Czech Rep, Radio Prague	7345eu	9505eu		
0700-0730	Ecuador, HCJB	9645pa	21455au		
0700-0800 as	Eqt Guinea, R East Africa	15186af			
0700-0800 mtwhf	Eqt Guinea, Radio Africa	15186af			
0700-0715	Ghana, Ghana Broadc Corp	3366do	4915do		
0700-0800	Guyana, GBC/Voice of	3290do			
0700-0800 vl	Italy, IRRS	3985va			
0700-0800	Japan, R Japan/NHK World	7230eu	11740as	11840as	11850pa
		11910as	11920as	15230me	17810va
		17815af			
0700-0800 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
0700-0800 vl	Kiribati, Radio	9810do			
0700-0800	Lebanon, Voice of Hope	9960va			
0700-0715	Liberia, LCN/R Liberia Int	5100do			
0700-0800 asmtwh	Malaysia, Radio	7295do			
0700-0800	Malaysia, Voice of	6175as	9750as	15295au	
0700-0758 as	New Zealand, R NZ Intl	9795pa			
0700-0800 mtwhf	New Zealand, R NZ Intl	9795pa			
0700-0730 s	Norway, Radio Norway Intl	9590va	11625va		
0700-0800 vl	Papua New Guinea, NBC	9675do			
0700-0745	Romania, R Romania Intl	15370pa	17720pa	17790pa	17805pa
0700-0715 s	Romania, R Romania Intl	15370pa	17720pa	17790pa	17805pa
0700-0800	Russia, Voice of Russia WS	12000au	12010as	12040as	12050as
		12070as	13645pa	13665pa	15470pa
		15490pa	15560au	15580as	15595na
		17570au	17580as	17610as	17795as
0700-0710	Sierra Leone, SLBS	3316do			
0700-0730	Slovakia, AWR Europe	9440au			
0700-0800 vl	Solomon Islands, SIBC	5020do			
0700-0735	Swaziland, Trans World R	6100af	9500af	9650af	
0700-0800	Taiwan, VO Free China	5950na			
0700-0800	United Kingdom, BBC WS	5975na	6190af	7145as	7325eu
		9410eu	9600af	9610af	9740as
		11760as	11835af	11940af	11955as
		12095va	15310as	15360as	15485af
		15575va	17640af	17760af	17785as
		17830af	21660as		
0700-0800 as	United Kingdom, BBC WS	17885af			
0700-0715	United Kingdom, BBC WS	6005af	7160af		
0700-0730	United Kingdom, BBC WS	6180eu	6195eu	7325af	9410eu
		11780eu			
0700-0800	United Kingdom, UCB	6200eu			
0700-0800	USA, KAIJ Dallas TX	5810am			
0700-0800	USA, KTBN Salt Lk City UT	7510am			
0700-0800	USA, KVOH Los Angeles CA	9975am			
0700-0800	USA, KWHR Naalehu HI	11565pa			
0700-0800	USA, Monitor Radio Intl	7535eu			
0700-0800	USA, WEWN Birmingham AL	5825eu			
0700-0800	USA, WHRI Noblesville IN	5745am			
0700-0800	USA, WJCR Upton KY	7490na			
0700-0800 smtwhf	USA, WMLK Bethel PA	9465va			
0700-0800	USA, WRMI/R Miami Intl	9955am			
0700-0800	USA, WWCR Nashville TN	2390am	3210am	5070am	5935am
0700-0800	USA, WYFR Okeechobee FL	7355eu	9985eu	13695af	
0700-0800 vl	Vanuatu, Radio	3945do	4960do		
0700-0800	Zambia, Christian Voice	6065af			
0700-0800 vl	Zambia, R Zambia/ZNBC 1	7220do			
0700-0800 vl	Zimbabwe, Zimbabwe BC	5975do			
0703-0708 as	Croatia, Croatian Radio	5895eu			
0730-0755	Austria, R Austria Intl	6155eu	13730eu	15410me	17870me
0730-0800	Belgium, R Vlaanderen Int	6035eu	9925eu	9940au	
0730-0800	Ecuador, HCJB	9645pa	9765eu		
0730-0800	Georgia, Radio	11805eu			
0730-0745 s	Greece, Voice of	7430eu	7450eu	9425au	9775au
		15175eu			
0730-0735	India, All India Radio	15185do	15260do		
0730-0800	Netherlands, Radio	9720pa	9820pa		
0730-0800 as	Palau, KHBH/Voice of Hope	9730as			
0730-0800	United Kingdom, BBC WS	15400va	15565va		
0735-0800 as	Swaziland, Trans World R	6100af	9500af	9650af	
0740-0800	Guam, TWR/KTWR	15200as			
0745-0800 s	Ghana, Ghana Broadc Corp	3366do	4915do		
0745-0755	Greece, Voice of	7430eu	7450eu	9425au	9775au
		15175eu			
0745-0800 as	Monaco, Trans World Radio	9755eu			
0755-0800 mtwhf	Monaco, Trans World Radio	9755eu			

0800-0900	Anguilla, Caribbean Beacon	6090am			
0800-0900	Australia, Radio	5995pa	9580pa	9710pa	11640pa
		12080pa	15365pa		
		11830as	15415as	17750pa	
0800-0830	Australia, Radio	5025do			
0800-0830 vl	Australia, VL8K Katherine	4910do			
0800-0900 mtwhf	Bhutan, Bhutan BC Service	5030do			
0800-0900 vl	Canada, CBC N Quebec Svc	9625do			
0800-0900	Canada, CFRX Toronto	6070do			
0800-0900	Canada, CFVP Calgary	6030do			
0800-0900	Canada, CHNX Halifax	6130do			
0800-0900	Canada, CKZU Vancouver	6160do			
0800-0900	Costa Rica, RF Peace Intl	7385am	7585am		
0800-0900	Ecuador, HCJB	9645pa	9765eu	21455au	
0800-0900 as	Eqt Guinea, R East Africa	15186af			
0800-0900 mtwhf	Eqt Guinea, Radio Africa	15186af			
0800-0830	Finland, YLE/R Finland	13645as	15235au		
0800-0805 s	Ghana, Ghana Broadc Corp	3366do			
0800-0900	Guam, TWR/KTWR	15200as			
0800-0900	Guyana, GBC/Voice of	3290do			
0800-0900	Indonesia, Voice of	9525as			
0800-0830 vl	Italy, IRRS	3985va			
0800-0900 vl	Kiribati, Radio	9810do			
0800-0900	Lebanon, Voice of Hope	9960va			
0800-0900	Liberia, LCN/R Liberia Int	5100do			
0800-0900	Malaysia, Radio	7295do			
0800-0825	Malaysia, Voice of	6175as	9750as	15295au	
0800-0900	Monaco, Trans World Radio	9755eu			
0800-0900	Netherlands, Radio	9720pa	9820pa		
0800-0816 mtwhf	New Zealand, R NZ Intl	9795pa			
0800-0830 s	Norway, Radio Norway Intl	11625as			
0800-0804	Pakistan, Radio	7110as	15465eu	17865eu	
0800-0900 as	Palau, KHBH/Voice of Hope	9730as			
0800-0900 vl	Papua New Guinea, NBC	9675do			
0800-0900	Russia, Voice of Russia WS	15470as	15560au	15580as	17570au
		17580as	17610au	17795as	
0800-0900 f	Seychelles, FEBA Radio	15540as			
0800-0810	Sierra Leone, SLBS	3316do			
0800-0900 vl	Solomon Islands, SIBC	5020do			
0800-0900	South Korea, R Korea Intl	9570au	13670eu		
0800-0805 as	Swaziland, Trans World R	6100af	9500af	9650af	
0800-0900	United Kingdom, BBC WS	6190af	7325eu	9410eu	9740as
		11750as	11760as	11940af	11955as
		12095eu	15310as	15360va	15400af
		15485va	15575va	17640va	17760as
		17785as	17830af	21660as	
0800-0900 as	United Kingdom, BBC WS	15565va	17885af		
0800-0815	United Kingdom, BBC WS	7145pa	11835af		
0800-0900	United Kingdom, UCB	6200eu			
0800-0900	USA, KAIJ Dallas TX	5810am			
0800-0900	USA, KNLS Anchor Point AK	6150as			
0800-0900	USA, KTBN Salt Lk City UT	7510am			
0800-0900	USA, KWHR Naalehu HI	11565pa			
0800-0900	USA, Monitor Radio Intl	7535eu	9845au	15665eu	
0800-0900	USA, WEWN Birmingham AL	5825eu			
0800-0900	USA, WHRI Noblesville IN	5745am	7315am		
0800-0900	USA, WJCR Upton KY	7490na			
0800-0900 smtwhf	USA, WMLK Bethel PA	9465va			
0800-0900	USA, WRMI/R Miami Intl	9955am			
0800-0900	USA, WWCR Nashville TN	2390am	3210am	5070am	5935am
0800-0900	Zambia, Christian Voice	6065af			
0800-0900 vl	Zambia, R Zambia/ZNBC 1	7220do			
0800-0900 vl	Zimbabwe, Zimbabwe BC	5975do			
0803-0808 s	Croatia, Croatian Radio	5920eu	7165va	9830eu	13830au
0804-0850	Pakistan, Radio	15465eu	17865eu		
0815-0900 mtwhf	Nigeria, FRCN/Radio	3326do	4770do	4990do	
0817-0900	New Zealand, R NZ Intl	6100pa			
0820-0900 vl	Chile, R Esperanza	6089am			
0830-0900 s	Armenia, Voice of	15270eu			
0830-0900 vl	Australia, VL8A Alice Spg	2310do			
0830-0900 vl	Australia, VL8K Katherine	2485do			
0830-0900 vl	Australia, VL8T Tent Crk	2325do			
0830-0840	India, All India Radio	7250do	15185do	15260do	
0830-0900 vl	Italy, IRRS	7125va			
0830-0900	Slovakia, R Slovakia Intl	11990au	15460au	17570au	
0830-0900	United Kingdom, BBC WS	15280as			
0855-0900	Guam, TWR/KTWR	11830au			

FREQUENCIES

0900-1000	Anguilla, Caribbean Beacon	6090am			
0900-1000	Australia, Radio	9580pa	11640pa		
0900-1000 vl	Australia, VLBA Alice Spg	2310do			
0900-1000 vl	Australia, VL8K Katherine	2485do			
0900-1000 vl	Australia, VL8T Tent Crk	2325do			
0900-1000	Canada, CFRX Toronto	6070do			
0900-1000	Canada, CFVP Calgary	6030do			
0900-1000	Canada, CHNX Halifax	6130do			
0900-1000	Canada, CKZU Vancouver	6160do			
0900-0935 vl	Chile, R Esperanza	6089am			
0900-1000	China, China Radio Intl	9785pa	11755pa		
0900-1000	Costa Rica, RF Peace Intl	7385am	7585am		
0900-0927	Czech Rep, Radio Prague	15640me	17485af		
0900-1000	Ecuador, HCJB	9645pa	21455au		
0900-0930	Ecuador, HCJB	9645pa	9765eu		
0900-1000 as	Eqt Guinea, R East Africa	15186af			
0900-1000 mtwhf	Eqt Guinea, Radio Africa	15186af			
0900-0950	Germany, Deutsche Welle	6160au	9565af	12055as	15410af
		17715au	17800af	21600af	21680as
0900-0915 mtwtf	Ghana, Ghana Broadc Corp	3366do			
0900-0955	Guam, TWR/KTWR	11835as			
0900-1000	Guyana, GBC/Voice of	3290do			
0900-1000 vl	Italy, IRRS	7125va			
0900-0930 vl	Kiribati, Radio	9810do			
0900-1000	Lebanon, Voice of Hope	9960va			
0900-0915	Liberia, LCN/R Liberia Int	5100do			
0900-1000	Malaysia, Radio	7295do			
0900-0935 a	Monaco, Trans World Radio	9755eu			
0900-0950 s	Monaco, Trans World Radio	9755eu			
0900-0920 mtwhf	Monaco, Trans World Radio	9755eu			
0900-0930	Mongolia, Voice of	15170as			
0900-0925	Netherlands, Radio	9720pa	9820au	13700pa	
0900-1000	New Zealand, R NZ Intl	6100pa			
0900-0930 s	Norway, Radio Norway Intl	13800as	15625au		
0900-1000 as	Palau, KHBN/Voice of Hope	9730as			
0900-1000 vl	Papua New Guinea, NBC	4890do			
0900-1000	Russia, Voice of Russia WS	9810au	11800au	15470as	15490as
		15560au	17610as	17795as	
0900-1000 s	Slovakia, AWR Europe	9450eu			
0900-1000 vl	Solomon Islands, SIBC	5020do			
0900-0930	Switzerland, Swiss R Intl	9885au	13685au	17515au	
0900-1000	United Kingdom, BBC WS	5965as	6190af	6195as	9410eu
		9740as	11750as	11765va	11940af
		11945as	12095eu	15190sa	15360as
		15400af	15485va	15565as	15575va
		17640va	17705eu	17830af	21660as
0900-0915	United Kingdom, BBC WS	7325eu	15310as	15360pa	17785as
0900-0945	United Kingdom, BBC WS	9580as	11760as	11955as	15280as
0900-1000	United Kingdom, UCB	6200eu			
0900-1000	USA, KAIJ Dallas TX	5810am			
0900-1000	USA, KTVN Salt Lk City UT	7510am			
0900-1000	USA, KWHR Naalehu HI	11565pa			
0900-1000	USA, Monitor Radio Intl	7395sa	7535eu	9385au	15665as
0900-1000	USA, WEWN Birmingham AL	5825eu	7425na		
0900-1000	USA, WHRI Noblesville IN	5745am	7315am		
0900-1000	USA, WJCR Upton KY	7490na			
0900-1000	USA, WRMI/R Miami Intl	9955am			
0900-1000	USA, WWCN Nashville TN	2390am	3210am	5070am	5935am
0900-1000	Zambia, Christian Voice	6065af			
0900-1000 vl	Zambia, R Zambia/ZNBC 1	7220do			
0900-1000 vl	Zimbabwe, Zimbabwe BC	5975do			
0903-0908 mtwhfa	Croatia, Croatian Radio	5920eu	7165eu	9830eu	13830au
0915-1000	Ghana, Ghana Broadc Corp	6130do	7295do		
0930-0955 mtwhfa	Austria, R Austria Intl	15455au	17870au		
0930-1000	Canada, CKZN St John's	6160do			
0930-1000	Georgia, Radio	11910eu			
0930-1000	Lithuania, Radio Vilnius	9710eu			
0930-1000	Netherlands, Radio	12065au	13710pa		
0930-1000	Philippines, FEBC/R Intl	11635as			

1000-1100 mtwhf	Eqt Guinea, Radio Africa	15186af			
1000-1100	Guam, AWR/KSDA	11790as	15170as		
1000-1100	Guam, TWR/KTWR	9865as			
1000-1100	India, All India Radio	11585as	13700as	15050as	17387au
		17840as			
1000-1100 vl	Italy, IRRS	7125va			
1000-1020 tfa	Kazakhstan, Radio Almaty	9620eu	11720eu		
1000-1100	Lebanon, Voice of Hope	9960va			
1000-1100	Malaysia, Radio	7295do			
1000-1100 vl	Malaysia, RTM Kuching	7160do			
1000-1100 vl	Malaysia, RTM Kota Kinabalu	5980do			
1000-1025	Netherlands, Radio	12065au	13710pa		
1000-1100	New Zealand, R NZ Intl	6100pa			
1000-1100	Nigeria, Voice of	7255af			
1000-1100 as	Palau, KHBN/Voice of Hope	9730as			
1000-1100 vl	Papua New Guinea, NBC	4890do			
1000-1100	Philippines, FEBC/R Intl	11635as			
1000-1100	Russia, Voice of Russia WS	7390as	9810as	11800as	11880as
		17610as	17795as		
1000-1100 vl	Solomon Islands, SIBC	5020do			
1000-1030	Switzerland, Swiss R Intl	6165eu	9535eu		
1000-1100	United Kingdom, BBC WS	5965va	6190af	6195am	9410eu
		9740as	11750as	11760as	11765va
		11940af	12095eu	15310as	15485va
		15565as	15575me	17640af	17705af
		17885va	21660as		
1000-1100 as	United Kingdom, BBC WS	15190am	15400am	17830af	
1000-1030	United Kingdom, BBC WS	15360as			
1000-1100	United Kingdom, UCB	6200eu			
1000-1100	USA, KAIJ Dallas TX	5810am			
1000-1100	USA, KTVN Salt Lk City UT	7510am			
1000-1100	USA, KWHR Naalehu HI	11565pa			
1000-1100	USA, Monitor Radio Intl	6095am	7395sa	15665as	15725as
1000-1100	USA, Voice of America	5985pa	6165am	7405am	9590am
		11720as	15425as		
1000-1100	USA, WEWN Birmingham AL	5825eu	7425na		
1000-1100	USA, WGTG McCaysville GA	9400am			
1000-1100	USA, WHRI Noblesville IN	6040am	9495am		
1000-1100	USA, WJCR Upton KY	7490na			
1000-1100 as	USA, WRMI/R Miami Intl	9955am			
1000-1100 s	USA, WRNO New Orleans LA	7355am	15420am		
1000-1100	USA, WWCN Nashville TN	2390am	3210am	5070am	5935am
1000-1100	USA, WYFR Okeechobee FL	5950na			
1000-1030 mtwhfa	Vatican State, Vatican R	5885eu	9645eu	11740eu	15595va
		17550va			
1000-1030	Vietnam, Voice of	5940as	7270as	7400as	9840as
		12020as	15010as		
1000-1100	Zambia, Christian Voice	6065af			
1000-1100 vl	Zambia, R Zambia/ZNBC 1	7220do			
1003-1008 s	Croatia, Croatian Radio	5920eu	7165va	9830eu	13830au
1020-1040 w	Kazakhstan, Radio Almaty	9620eu	11720eu		
1030-1055 s	Austria, R Austria Intl	15455au	17870au		
1030-1057	Czech Rep, Radio Prague	7345eu	9505eu		
1030-1100 mtwhf	Ethiopia, Radio	5990do	7110do	9705do	
1030-1100	Georgia, Radio	11910me			
1030-1100	Guam, AWR/KSDA	15170as			
1030-1100	Netherlands, Radio	6045eu	9860eu	12065as	13710as
1030-1100	South Korea, R Korea Intl	11715am			
1030-1100	Sri Lanka, Sri Lanka BC	11835as	17850as		
1030-1055	UAE, Radio Dubai	13675eu	15395eu	17630eu	21605me

1000 UTC

1000-1100	Anguilla, Caribbean Beacon	6090am			
1000-1100	Australia, Radio	9580pa			
1000-1100 vl	Australia, VLBA Alice Spg	2310do			
1000-1100 vl	Australia, VL8K Katherine	2485do			
1000-1100 vl	Australia, VL8T Tent Crk	2325do			
1000-1025	Belgium, R Vlaanderen Int	6035eu	7190eu		
1000-1100 vl	Canada, CBC N Quebec Svc	9625do			
1000-1100	Canada, CFRX Toronto	6070do			
1000-1100	Canada, CFVP Calgary	6030do			
1000-1100	Canada, CHNX Halifax	6130do			
1000-1100	Canada, CKZN St John's	6160do			
1000-1100	Canada, CKZU Vancouver	6160do			
1000-1100	China, China Radio Intl	9785pa	11755pa		
1000-1100	Costa Rica, RF Peace Intl	7385am	7585am		
1000-1100	Ecuador, HCJB	9645pa	21455au		
1000-1100 as	Eqt Guinea, R East Africa	15186af			

MT MONITORING TEAM

Next Reporting Deadline: November 18, 1997

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THANK YOU...

ADDITIONAL CONTRIBUTORS TO THIS MONTH'S SHORTWAVE GUIDE:

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FREQUENCIES

1100-1200	Anguilla, Caribbean Beacon	11775am				1100-1130 vl	Solomon Islands, SIBC	5020do			
1100-1200	Australia, Radio	6080as	9580pa			1100-1130	Sri Lanka, Sri Lanka BC	11835as	17850as		
1100-1200 s	Australia, Radio	9415va	11660as			1100-1130	Switzerland, Swiss R Intl	13635as	15415as	17515as	
1100-1200 vl	Australia, VL8A Alice Spg	2310do				1100-1200	Taiwan, Voice of Asia	7445as			
1100-1200 vl	Australia, VL8K Katherine	2485do				1100-1200	United Kingdom, BBC WS	5965am	6190af	6195va	9410eu
1100-1200 vl	Australia, VL8T Tent Crk	2325do						9580as	11750as	11760as	11940af
1100-1200	Canada, CFRX Toronto	6070do						11955as	12095eu	15220am	15310as
1100-1200	Canada, CFVP Calgary	6030do						15485va	15565as	15575va	17640na
1100-1200	Canada, CHNX Halifax	6130do						17705eu	17830af	17885af	21660af
1100-1200	Canada, CKZN St John's	6160do				1100-1130 as	United Kingdom, BBC WS	15190am			
1100-1200	Canada, CKZU Vancouver	6160do				1100-1130	United Kingdom, BBC WS	9700as	11765va	15310as	17785as
1100-1200	Costa Rica, Adv World R	5030am	6150am	7375am	9725am	1100-1145	United Kingdom, BBC WS	15400af	17790as		
		13750am				1100-1200	United Kingdom, UCB	6200eu			
1100-1200	Costa Rica, RF Peace Intl	7385am	7585am			1100-1200	USA, KAIJ Dallas TX	5810am			
1100-1200	Ecuador, HCJB	12005am	15115am	21455au		1100-1200	USA, KTBH Salt Lk City UT	7510am			
1100-1200 as	Eq Guinea, R East Africa	15186af				1100-1200	USA, KWHR Naalehu HI	11565pa			
1100-1200	Eq Guinea, Radio Africa	9530as				1100-1200	USA, Monitor Radio Intl	6095am	7395am	9355as	9385au
1100-1150	Germany, Deutsche Welle	15370af	15410af	17765af	17800af			9430au			
1100-1130	Israel, Kol Israel	15650eu				1100-1200	USA, Voice of America	5985pa	6160as	9645as	9760as
1100-1130 vl	Italy, IRRS	7125va						11720as	15160as	15425as	
1100-1200	Japan, R Japan/NHK World	6120na	7125na	11815as		1100-1200	USA, WEWN Birmingham AL	7425na			
1100-1200	Jordan, Radio	11690eu				1100-1200	USA, WGTG McCaysville GA	9400am			
1100-1200	Lebanon, Voice of Hope	9960va				1100-1200	USA, WHRI Noblesville IN	6040am	9495am		
1100-1110	Liberia, LCN/R Liberia Int	5100do				1100-1200	USA, WJCR Upton KY	7490na			
1100-1200	Malaysia, Radio	7295do				1100-1200	USA, WRMI/R Miami Intl	9955am			
1100-1200 vl	Malaysia, RTM Kuching	7160do				1100-1200 s	USA, WRNO New Orleans LA	7355am	15420am		
1100-1200 vl	Malaysia, RTM Kota Kinabalu	5980do				1100-1200	USA, WWCR Nashville TN	2390am	5070am	5935am	15685am
1100-1129	Mozambique, Radio	11812do				1100-1200	USA, WYFR Okeechobee FL	5950na	11830na		
1100-1125	Netherlands, Radio	12065as	13710as			1100-1130	Vietnam, Voice of	7285as	9730as		
1100-1200	New Zealand, R NZ Intl	6100pa				1100-1200	Zambia, Christian Voice	6065af			
1100-1157	North Korea, R Pyongyang	3560af	9640af	9975af	11335af	1100-1200 vl	Zambia, R Zambia/ZNBC 1	7220do			
		13650af	15230af			1120-1140	Australia, Defense Forces R	4763as			
1100-1120	Pakistan, Radio	7110va	15520eu	17865eu		1130-1200 vl	China, China Radio Intl	6995as	8660as	11445as	11700as
1100-1130 as	Palau, KHBN/Voice of Hope	9730as						15480as			
1100-1200 vl	Papua New Guinea, NBC	4890do				1130-1200	Iran, VOIRI	9555as	11830as	11875as	15260as
1100-1200	Russia Voice of Russia WS	7330as	7390as	9810au	9835au	1130-1140	Lesotho, Radio Lesotho	4800do			
		11655as	11800au	11880as	15170as	1130-1200	Myanmar, Voice of	5990do			
		15435as	15490as	15510as	17560as	1130-1200	Netherlands, Radio	6045eu	9860eu		
		17610as	17775as	17795as		1130-1200	Sweden, Radio	11650na	15240na		
1100-1200	Singapore, R Singapore Intl	6015as	6155as			1130-1200	United Kingdom, BBC WS	6195am	17705va		
						1135-1140	India, All India Radio	9595do	11620do	11710do	15185do

SELECTED PROGRAMS

Sundays

- 1100 Germany, Deutsche Welle: News. See S 0100.
 1100 Singapore, R Singapore Intl: News. Singapore, regional and international news.
 1100 Switzerland, Swiss R Intl: News. See S 0100.
 1105 Singapore, R Singapore Intl: The Week Ahead. A diary of major events in Singapore in the coming week.
 1105 Switzerland, Swiss R Intl: Newsnet. See S 0105.
 1106 Germany, Deutsche Welle: Religion and Society. News and developments concerning the world's major religions.
 1110 Singapore, R Singapore Intl: Asean Notes. A montage of cultural and social events in the Asean region.
 1115 Singapore, R Singapore Intl: Profile. A personality profile of prominent Singaporeans and foreigners who have made their mark in their chosen fields.
 1118 Germany, Deutsche Welle: COOL. NEW! A youth Magazine.
 1130 Singapore, R Singapore Intl: News. See S 1100.
 1135 Singapore, R Singapore Intl: Regional Press Review. A review of the major issues discussed in the editorials of the regional papers during the week.
 1145 Singapore, R Singapore Intl: Business World. A magazine program which analyzes the latest business and financial trends in Singapore and the rest of Asia.
 1150 Singapore, R Singapore Intl: Specials. An in depth look at a topical issue concerning Singapore, the region and the world.

Mondays

- 1100 Germany, Deutsche Welle: News. See S 0100.
 1100 Singapore, R Singapore Intl: News. See S 1100.
 1100 Switzerland, Swiss R Intl: News. See S 0100.
 1105 Switzerland, Swiss R Intl: Newsnet. See S 0105.
 1106 Germany, Deutsche Welle: NewsLink. Global current affairs as seen from the heart of Europe.
 1109 Singapore, R Singapore Intl: Business and Market Report. A roundup of financial and business news.
 1115 Singapore, R Singapore Intl: Arts Arena. A program devoted to the visual and performing arts featuring interviews with key personalities.
 1130 Singapore, R Singapore Intl: News. See S 1100.
 1133 Germany, Deutsche Welle: Africa Report. Reports and background to the news from Africa by Deutsche Welle correspondents.
 1135 Singapore, R Singapore Intl: The Front Page. Headlines from

- the front pages of Singaporean and regional dailies.
 1138 Singapore, R Singapore Intl: E-Z Beat. See S 1205.
 1145 Singapore, R Singapore Intl: Newslite. An analysis of the news making headlines in Singapore, the region, and the world.

Tuesdays

- 1100 Germany, Deutsche Welle: News. See S 0100.
 1100 Singapore, R Singapore Intl: News. See S 1100.
 1100 Switzerland, Swiss R Intl: News. See S 0100.
 1105 Switzerland, Swiss R Intl: Newsnet. See S 0105.
 1106 Germany, Deutsche Welle: NewsLink. See M 1106.
 1109 Singapore, R Singapore Intl: Business and Market Report. See M 1109.
 1115 Singapore, R Singapore Intl: Kaleidoscope. See S 1240.
 1130 Singapore, R Singapore Intl: News. See S 1100.
 1133 Germany, Deutsche Welle: Africa Report. See M 1133.
 1135 Singapore, R Singapore Intl: The Front Page. See M 1135.
 1138 Singapore, R Singapore Intl: E-Z Beat. See S 1205.
 1145 Singapore, R Singapore Intl: Newslite. See M 1145.

Wednesdays

- 1100 Germany, Deutsche Welle: News. See S 0100.
 1100 Singapore, R Singapore Intl: News. See S 1100.
 1100 Switzerland, Swiss R Intl: News. See S 0100.
 1105 Switzerland, Swiss R Intl: Newsnet. See S 0105.
 1106 Germany, Deutsche Welle: NewsLink. See M 1106.
 1109 Singapore, R Singapore Intl: Business and Market Report. See M 1109.
 1115 Singapore, R Singapore Intl: Star Trax. A showcase of events on the pop, movie, and entertainment beats.
 1130 Singapore, R Singapore Intl: News. See S 1100.
 1133 Germany, Deutsche Welle: Africa Report. See M 1133.
 1135 Singapore, R Singapore Intl: The Front Page. See M 1135.
 1138 Singapore, R Singapore Intl: E-Z Beat. See S 1205.
 1145 Singapore, R Singapore Intl: Newslite. See M 1145.

Thursdays

- 1100 Germany, Deutsche Welle: News. See S 0100.
 1100 Singapore, R Singapore Intl: News. See S 1100.
 1100 Switzerland, Swiss R Intl: News. See S 0100.
 1105 Switzerland, Swiss R Intl: Newsnet. See S 0105.
 1106 Germany, Deutsche Welle: NewsLink. See M 1106.

- 1109 Singapore, R Singapore Intl: Business and Market Report. See M 1109.
 1115 Singapore, R Singapore Intl: Happening!. See S 1340.
 1130 Singapore, R Singapore Intl: News. See S 1100.
 1133 Germany, Deutsche Welle: Africa Report. See M 1133.
 1135 Singapore, R Singapore Intl: The Front Page. See M 1135.
 1138 Singapore, R Singapore Intl: E-Z Beat. See S 1205.
 1145 Singapore, R Singapore Intl: Newslite. See M 1145.

Fridays

- 1100 Germany, Deutsche Welle: News. See S 0100.
 1100 Singapore, R Singapore Intl: News. See S 1100.
 1100 Switzerland, Swiss R Intl: News. See S 0100.
 1105 Switzerland, Swiss R Intl: Newsnet. See S 0105.
 1106 Germany, Deutsche Welle: NewsLink. See M 1106.
 1109 Singapore, R Singapore Intl: Business and Market Report. See M 1109.
 1115 Singapore, R Singapore Intl: The Written Word. See M 1240.
 1130 Singapore, R Singapore Intl: News. See S 1100.
 1133 Germany, Deutsche Welle: Africa Report. See M 1133.
 1135 Singapore, R Singapore Intl: The Front Page. See M 1135.
 1138 Singapore, R Singapore Intl: E-Z Beat. See S 1205.
 1145 Singapore, R Singapore Intl: Newslite. See M 1145.

Saturdays

- 1100 Germany, Deutsche Welle: News. See S 0100.
 1100 Singapore, R Singapore Intl: News. See S 1100.
 1100 Switzerland, Swiss R Intl: News. See S 0100.
 1105 Singapore, R Singapore Intl: The Week Ahead. See S 1105.
 1105 Switzerland, Swiss R Intl: Newsnet. See S 0105.
 1106 Germany, Deutsche Welle: Talking Point. Journalists discuss major trends and events.
 1110 Singapore, R Singapore Intl: Wired Up. See H 1240.
 1115 Switzerland, Swiss R Intl: Capital Letters (2/4). See S 0115.
 1115 Switzerland, Swiss R Intl: Sounds Good (3/5). See S 0115.
 1115 Switzerland, Swiss R Intl: The Name Game (1). See S 0115.
 1120 Singapore, R Singapore Intl: Regional Press Review. See S 1135.
 1130 Singapore, R Singapore Intl: News. See S 1100.
 1133 Germany, Deutsche Welle: African Kaleidoscope. NEW! A weekly review of trends and events on the African continent.
 1135 Singapore, R Singapore Intl: Reflections. See T 1240.
 1145 Singapore, R Singapore Intl: Business World. See S 1145.
 1150 Singapore, R Singapore Intl: Specials. See S 1150.

FREQUENCIES

1200-1300	Anguilla, Caribbean Beacon	11775am				1200-1300	Singapore, R Singapore Int	6015as	6155as		
1200-1300	Australia, Radio	5995as	6080as	9580pa	11800pa	1200-1300	South Korea, R Korea Intl	7285af			
1200-1300 s	Australia, Radio	9415va	11660as			1200-1300	Switzerland, Swiss R Intl	6165eu	9535eu		
1200-1300 vl	Australia, VL8A Alice Spg	2310do				1200-1300	Taiwan, VO Free China	7130au	9610as		
1200-1300 vl	Australia, VL8K Katherine	2485do				1200-1300	United Kingdom, BBC WS	6190af	6195va	9410eu	9515am
1200-1300 vl	Australia, VL8T Tent Crk	2325do						9580as	9740as	11750as	11760as
1200-1300	Brazil, Radio Bras	15445na						11940af	11955as	15220am	15310as
1200-1215	Cambodia, Natl Voice of	11940as						15485va	15565va	15575va	17640va
1200-1300 vl	Canada, CBC N Quebec Svc	9625do						17705af	17830af	17885af	21660af
1200-1300	Canada, CFRX Toronto	6070do				1200-1300	United Kingdom, UCB	6200eu			
1200-1300	Canada, CFVP Calgary	6030do				1200-1300	USA, KALJ Dallas TX	5810am			
1200-1300	Canada, CHNX Halifax	6130do				1200-1300	USA, KTNB Salt Lk City UT	7510am			
1200-1300	Canada, CKZN St John's	6160do				1200-1300	USA, KWHR Naalehu HI	11565pa			
1200-1300	Canada, CKZU Vancouver	6160do				1200-1300	USA, Monitor Radio Intl	6095am	9355as	9455am	
1200-1230	Canada, R Canada Intl	9640na	9660as	11855na	13650na	1200-1230	USA, Voice of America	6160as	9645as	9760as	11715as
		15195as						15160as	15425as		
1200-1300	Canada, R Canada Intl	9640am	11855am	13650am		1200-1300	USA, WEWN Birmingham AL	7425eu			
1200-1300	China, China Radio Intl	7385pa	9565pa	9715as	11660as	1200-1300	USA, WGTG McCaysville GA	9400am			
		11795pa	15440as			1200-1300	USA, WHRI Noblesville IN	6040am	9495am		
1200-1230 vl	China, China Radio Intl	6995as	8660as	11445as	11700as	1200-1300	USA, WJCR Upton KY	7490na			
		12110as				1200-1300	USA, WRMI/R Miami Intl	9955am			
1200-1300	Costa Rica, RF Peace Intl	7385am				1200-1300 s	USA, WRNO New Orleans LA	7355am	15420am		
1200-1300	Ecuador, HCJB	12005am	15115am	21455am		1200-1300	USA, WWCR Nashville TN	2390am	5070am	5935am	15685am
1200-1300 as	Eqt Guinea, R East Africa	15186af				1200-1300	USA, WYFR Okeechobee FL	5950na	6015na	11830na	17750na
1200-1300	Eqt Guinea, Radio Africa	9530as				1200-1230	Uzbekistan, R Tashkent	7190as	7285as	9715as	15295as
1200-1257	France, Radio France Intl	9805af	11600as	13625eu	15155eu	1200-1300	Zambia, Christian Voice	6065af			
		15195eu	15540af	17575af		1200-1300 vl	Zambia, R Zambia/ZNBC 1	7220do			
		9710eu				1207-1300 occsnal	New Zealand, R NZ Intl	6100pa			
1200-1230 s	Germany, Universal Life	9555as	11830as	11875as	15260as	1215-1300	Egypt, Radio Cairo	17595as			
1200-1230	Iran, VOIRI	7125va				1215-1300	United Kingdom, BBC WS	15220am			
1200-1300 vl	Italy, IRRS	7125as				1230-1255	Austria, R Austria Intl	6155eu	13730na		
1200-1300	Japan, R Japan/NHK World	11690eu				1230-1300	Bangladesh, Bangla Betar	7185as	9550as		
1200-1300	Jordan, Radio	9960va				1230-1300 mtwhf	Finland, YLE/R Finland	11900na	15400na		
1200-1300	Lebanon, Voice of Hope	7295do				1230-1300	Guam, AWR/KSDA	13720as			
1200-1300 vl	Malaysia, Radio	5980do				1230-1235	India, All India Radio	4860do	6150do	17860do	
1200-1250	Malaysia, RTM KotaKinabalu	5990do				1230-1300 w	Indonesia, RRI Sorong	4875do			
1200-1300	Myanmar, Voice of	6045eu	9860eu			1230-1300	Mongolia, Voice of	12085as			
1200-1205	Netherlands, Radio	6100pa				1230-1300	Romania, R Romania Intl	9690eu	11885eu	15365eu	17720eu
1200-1230 s	New Zealand, R NZ Intl	9590eu	13800as	13805na	15605au	1230-1300	South Korea, R Korea Intl	9570as	9640as	13670as	
1200-1300 vl	Norway, Radio Norway Intl	4890do				1230-1300 mtwhf	Sri Lanka, Sri Lanka BC	9730as			
1200-1300	Papua New Guinea, NBC	4740as	7330as	11655as	11880as	1230-1300	Sweden, Radio	13740as	15240pa		
	Russia, Voice of Russia WS	15170as	15460as	15490as	15500as	1230-1300	Thailand, Radio	9505as	9655as	9885as	11905as
		15510as	17560as	17610as	17755as	1230-1300	Vietnam, Voice of	5940as	7270as	7400as	9840as
		17775as	17795as			1240-1250	Greece, Voice of	12020as	15010as	15650af	17525af
								11645af	15175af		

SELECTED PROGRAMS

Sundays

- 1200 USA, WEWN Birmingham AL: Reflections on the Sacraments. Father Pavone.
- 1200 Singapore, R Singapore Intl: News. See S 1100.
- 1205 Singapore, R Singapore Intl: E-Z Beat. Adult contemporary music program.
- 1210 Singapore, R Singapore Intl: Perspective. Panel discussion on issues of interest.
- 1228 USA, WEWN Birmingham AL: Who Do You Say I Am? Father Mitch Pacwa of Loyola University teaches.
- 1230 Singapore, R Singapore Intl: News. See S 1100.
- 1235 Singapore, R Singapore Intl: E-Z Beat. See S 1205.
- 1240 Singapore, R Singapore Intl: Kaleidoscope. A lifestyle magazine that looks at leisure, food, culture, heritage, fashion, travel, and consumer trends.
- 1255 USA, WEWN Birmingham AL: Today's Saint. A short biography of a saint whose feastday is being celebrated.
- 1255 Singapore, R Singapore Intl: E-Z Beat. See S 1205.

Mondays

- 1200 USA, WEWN Birmingham AL: The Spirituality of the Catholic Church. Father Paul Keenan teaches on God and man and the new catechism of the Catholic Church.
- 1200 Singapore, R Singapore Intl: News. See S 1100.
- 1200 USA, WGTG McCaysville GA: USA Radio News. See S 0200.
- 1205 Singapore, R Singapore Intl: E-Z Beat. See S 1205.
- 1220 Singapore, R Singapore Intl: Business and Market Report. See M 1109.
- 1230 USA, WEWN Birmingham AL: Morning Prayer. A half-hour of devotion to begin the day.
- 1230 Singapore, R Singapore Intl: News. See S 1100.
- 1235 Singapore, R Singapore Intl: E-Z Beat. See S 1205.
- 1240 Singapore, R Singapore Intl: The Written Word. Interviews, reviews, comments and analysis from the world of print.
- 1244 USA, WEWN Birmingham AL: In Season - Out of Season. Father Tom DiLorenzo with a program of reflections.

Tuesdays

- 1200 USA, WEWN Birmingham AL: Parenting Children and Teens.

- Steve Wood offers practical guidelines for strengthening families.
- 1200 Singapore, R Singapore Intl: News. See S 1100.
- 1200 USA, WGTG McCaysville GA: USA Radio News. See S 0200.
- 1205 Singapore, R Singapore Intl: E-Z Beat. See S 1205.
- 1220 Singapore, R Singapore Intl: Business and Market Report. See M 1109.
- 1230 USA, WEWN Birmingham AL: Morning Prayer. See M 1230.
- 1230 Singapore, R Singapore Intl: News. See S 1100.
- 1235 Singapore, R Singapore Intl: E-Z Beat. See S 1205.
- 1240 Singapore, R Singapore Intl: Reflections. Vignettes of life in Singapore and the region as seen through the eyes of writers, poets, and commentators.
- 1244 USA, WEWN Birmingham AL: In Season - Out of Season. See M 1244.
- 1250 Singapore, R Singapore Intl: Classic Gold. A golden-oldies music program.

Wednesdays

- 1200 USA, WEWN Birmingham AL: A Closer Walk. Father Cohen.
- 1200 Singapore, R Singapore Intl: News. See S 1100.
- 1200 USA, WGTG McCaysville GA: USA Radio News. See S 0200.
- 1205 Singapore, R Singapore Intl: E-Z Beat. See S 1205.
- 1220 Singapore, R Singapore Intl: Business and Market Report. See M 1109.
- 1230 USA, WEWN Birmingham AL: Morning Prayer. See M 1230.
- 1230 Singapore, R Singapore Intl: News. See S 1100.
- 1235 Singapore, R Singapore Intl: E-Z Beat. See S 1205.
- 1240 Singapore, R Singapore Intl: Perspective. See S 1210.
- 1244 USA, WEWN Birmingham AL: In Season - Out of Season. See M 1244.

Thursdays

- 1200 USA, WEWN Birmingham AL: Crisis Magazine. NEW! Host Deal Hudson probes current issues from a distinctly Catholic perspective.
- 1200 Singapore, R Singapore Intl: News. See S 1100.
- 1200 USA, WGTG McCaysville GA: USA Radio News. See S 0200.
- 1205 Singapore, R Singapore Intl: E-Z Beat. See S 1205.

- 1220 Singapore, R Singapore Intl: Business and Market Report. See M 1109.
- 1230 USA, WEWN Birmingham AL: Morning Prayer. See M 1230.
- 1230 Singapore, R Singapore Intl: News. See S 1100.
- 1235 Singapore, R Singapore Intl: E-Z Beat. See S 1205.
- 1240 Singapore, R Singapore Intl: Wired Up. Interesting thoughts surfacing on the Internet.
- 1244 USA, WEWN Birmingham AL: In Season - Out of Season. See M 1244.
- 1250 Singapore, R Singapore Intl: E-Z Beat. See S 1205.

Fridays

- 1200 USA, WEWN Birmingham AL: Answering Common Objections. Scott Hahn explains and defends the teachings of the Catholic faith.
- 1200 Singapore, R Singapore Intl: News. See S 1100.
- 1200 USA, WGTG McCaysville GA: USA Radio News. See S 0200.
- 1205 Singapore, R Singapore Intl: E-Z Beat. See S 1205.
- 1220 Singapore, R Singapore Intl: Business and Market Report. See M 1109.
- 1230 USA, WEWN Birmingham AL: Morning Prayer. See M 1230.
- 1230 Singapore, R Singapore Intl: News. See S 1100.
- 1235 Singapore, R Singapore Intl: E-Z Beat. See S 1205.
- 1240 Singapore, R Singapore Intl: Profile. See S 1115.
- 1244 USA, WEWN Birmingham AL: In Season - Out of Season. See M 1244.
- 1255 Singapore, R Singapore Intl: E-Z Beat. See S 1205.

Saturdays

- 1200 USA, WEWN Birmingham AL: The Gospel of Life. See M 1600.
- 1200 Singapore, R Singapore Intl: News. See S 1100.
- 1205 Singapore, R Singapore Intl: E-Z Beat. See S 1205.
- 1215 Singapore, R Singapore Intl: Star Trax. See W 1115.
- 1228 USA, WEWN Birmingham AL: Sing-A-Long for Kids. See S 0028.
- 1230 Singapore, R Singapore Intl: News. See S 1100.
- 1235 Singapore, R Singapore Intl: E-Z Beat. See S 1205.
- 1240 Singapore, R Singapore Intl: Asean Notes. See S 1110.
- 1245 Singapore, R Singapore Intl: Arts Arena. See M 1115.

FREQUENCIES

1400-1500	Anguilla, Caribbean Beacon	11775am				1400-1500	United Kingdom, BBC WS	5990as	6190af	6195as	9410eu
1400-1500	Australia, Radio	5870pa	5995pa	9415va	11800pa			9515am	9740as	11750as	11865am
1400-1500 vl	Australia, VL8A Alice Spg	2310do						11940af	12095eu	15220am	15485va
1400-1500 vl	Australia, VL8K Katherine	2485do						15565as	15575va	17640va	17830af
1400-1500 vl	Australia, VIB Tent Crk	2325do						17840am	21470af	21660af	
1400-1425 mtwhfa	Belgium, R Vlaanderen Int	13785as	15535as			1400-1500	United Kingdom, UCB	6200eu			
1400-1500 vl	Canada, CBC N Quebec Svc	9625do				1400-1500	USA, KAIJ Dallas TX	13815am			
1400-1500	Canada, CFRX Toronto	6070do				1400-1500	USA, KTNB Salt Lk City UT	7510am			
1400-1500	Canada, CFVP Calgary	6030do				1400-1500	USA, KWHR Naalehu HI	7510pa			
1400-1500	Canada, CHNX Halifax	6130do				1400-1500	USA, Monitor Radio Intl	9355as			
1400-1500	Canada, CKZN St John's	6160do				1400-1500	USA, Voice of America	6160as	7125as	7215as	9645as
1400-1500	Canada, CKZU Vancouver	6160do						9760as	15160as	15225va	15395as
1400-1500 s	Canada, R Canada Intl	11855na	13650na					15425as			
1400-1500	China, China Radio Intl	7160as	7405na	9535as	11825as	1400-1500	USA, WEWN Birmingham AL	7425na	11875na	15375sa	15745eu
1400-1500	Ecuador, HCJB	12005am	15115am	21455am		1400-1500	USA, WGTG McCaysville GA	9400am			
1400-1500 as	Egt Guinea, R East Africa	15186af				1400-1500	USA, WHRI Noblesville IN	6040am	15105am		
1400-1457	France, Radio France Intl	11910as	15405me	17560me		1400-1500	USA, WJCR Upton KY	7490na			
1400-1500	India, All India Radio	9545as	11620as	13710as		1400-1500	USA, WRMI/R Miami Intl	9955am			
1400-1430 vl	Italy, IRRS	7125va				1400-1500	USA, WRNO New Orleans LA	7355am	15420am		
1400-1500	Japan, R Japan/NHK World	7200eu				1400-1500	USA, WYFR Okeechobee FL	9475am	12160am	13845am	15685am
1400-1500	Jordan, Radio	11690eu				1400-1500	Vatican State, Vatican R	5950na	13765au		
1400-1500	Malaysia, Radio	7295do				1400-1405	Zambia, Christian Voice	11625au			
1400-1500	Malaysia, RTM Kuching	7160do				1400-1500 vl	Zambia, R Zambia/ZNBC 1	6065af			
1400-1500 vl	Malaysia, RTM Kota Kinabalu	5980do				1415-1425	Nepal, Radio	4910do			
1400-1500	Netherlands, Radio	9890as	12090as	15585as		1430-1440	Palau, KBN/Voice of Hope	5005do	7165do		
1400-1500 occsnal	New Zealand, R NZ Intl	6100pa				1430-1500 vl	China, China Radio Intl	9985as			
1400-1410	Pakistan, Radio	9485af	9645va	11565af	15595me	1430-1500 vl	Guam, AWR/KSDA	6995as	8660as	9880as	11445as
1400-1500 vl	Papua New Guinea, NBC	4890do				1430-1500	India, All India Radio	7400as			
1400-1500	Philippines, FEBC/R Intl	11995as				1430-1440	Indonesia, RRI Uj Pandang	6150do	9565do	9835do	
1400-1500	Russia, Voice of Russia WS	7330as	11700as	15430as	15460as	1430-1500 vl	Italy, IRRS	4753do			
		15550as	17610as	17795as		1430-1500	Romania, R Romania Intl	3985va			
1400-1500	Singapore, R Corp of Sing	6155do				1430-1500 vl	Zambia, R Zambia/ZNBC 2	15335as	17720as		
1400-1500	Sri Lanka, Sri Lanka BC	9730as				1435-1445	Greece, Voice of	6165do			
1400-1430	Thailand, Radio	9655as	9830as	11905as		1440-1500	Myanmar, Voice of	9375eu	9590na	11645na	15175na
1400-1430	Turkey, Voice of	13695eu	13750va	15290as		1450-1500	Vatican State, Vatican R	5990do			
1400-1410 thfs	Turkmenistan, Turkmen R	5015eu				1455-1500	Georgia, Voice of Hope	11635au	13765au		

SELECTED PROGRAMS

Sundays

- 1400 Russia, Voice of: News. See S 0200.
 1400 USA, WGTG McCaysville GA: USA Radio News. See S 0200.
 1404 USA, WGTG McCaysville GA: The Gospel Hour. Oliver Reed provides music and inspiration from South Carolina.
 1411 Russia, Voice of: Science and Engineering in the Commonwealth. The latest developments in science and technology.
 1430 USA, WEWN Birmingham AL: The Holy Rosary (Glorious). See S 0400.
 1430 Russia, Voice of: News in Brief. Ninety seconds news summary every hour on the half-hour.
 1430 USA, WGTG McCaysville GA: Music. See S 0000.
 1432 Russia, Voice of: Your Top Tune. Win a prize by guessing which song of the three is the most popular.
 1447 Russia, Voice of: You Write to Moscow. A program based on listeners' letters, what they think about the programs, their opinions on events, and info on contests, DXing, stamp collecting, cocking, etc.

Mondays

- 1400 USA, WEWN Birmingham AL: The Holy Rosary (Joyful). See S 0400.
 1400 Russia, Voice of: News. See S 0200.
 1400 USA, WGTG McCaysville GA: USA Radio News. See S 0200.
 1404 USA, WGTG McCaysville GA: The Gospel Hour. See S 1404.
 1411 Russia, Voice of: Moscow Mailbag. Joe Adamov answers 15-20 listener questions every week.
 1430 USA, WEWN Birmingham AL: The Chaplet of Divine Mercy. See S 0400.
 1430 Russia, Voice of: News in Brief. See S 1430.
 1430 USA, WGTG McCaysville GA: Music. See S 0000.
 1432 Russia, Voice of: Audio Book Club. The best of Russian classic and contemporary literature.
 1440 USA, WGTG McCaysville GA: Daily Scripture Reading. A talking book series from both old and new testaments narrated by Alexander Scourby.
 1450 USA, WGTG McCaysville GA: Music. See S 0000.

Tuesdays

- 1400 USA, WEWN Birmingham AL: The Holy Rosary (Sorrowful). See S 0400.
 1400 Russia, Voice of: News. See S 0200.
 1400 USA, WGTG McCaysville GA: USA Radio News. See S

0200.
 1404 USA, WGTG McCaysville GA: The Gospel Hour. See S 1404.
 1411 Russia, Voice of: Newmarket. This program tells where and how to invest in Russia, how to sell your product, or start a business, and news about Russia's involvement in international business.
 1430 USA, WEWN Birmingham AL: The Chaplet of Divine Mercy. See S 0400.
 1430 Russia, Voice of: News in Brief. See S 1430.
 1430 USA, WGTG McCaysville GA: Music. See S 0000.
 1432 Russia, Voice of: Kaleidoscope. See S 1532.
 1440 USA, WGTG McCaysville GA: Daily Scripture Reading. See M 1440.
 1450 USA, WGTG McCaysville GA: Music. See S 0000.

Wednesdays

- 1400 USA, WEWN Birmingham AL: The Holy Rosary (Glorious). See S 0400.
 1400 Russia, Voice of: News. See S 0200.
 1400 USA, WGTG McCaysville GA: USA Radio News. See S 0200.
 1404 USA, WGTG McCaysville GA: The Gospel Hour. See S 1404.
 1411 Russia, Voice of: Moscow Mailbag. See M 1411.
 1430 USA, WEWN Birmingham AL: The Chaplet of Divine Mercy. See S 0400.
 1430 Russia, Voice of: News in Brief. See S 1430.
 1430 USA, WGTG McCaysville GA: Music. See S 0000.
 1432 Russia, Voice of: Russian by Radio. A course in the Russian language.
 1440 USA, WGTG McCaysville GA: Daily Scripture Reading. See M 1440.
 1450 USA, WGTG McCaysville GA: Music. See S 0000.

Thursdays

- 1400 USA, WEWN Birmingham AL: The Holy Rosary (Joyful). See S 0400.
 1400 Russia, Voice of: News. See S 0200.
 1400 USA, WGTG McCaysville GA: USA Radio News. See S 0200.
 1404 USA, WGTG McCaysville GA: The Gospel Hour. See S 1404.
 1411 Russia, Voice of: Moscow Mailbag. See M 1411.
 1430 USA, WEWN Birmingham AL: The Chaplet of Divine Mercy. See S 0400.
 1430 Russia, Voice of: News in Brief. See S 1430.
 1430 USA, WGTG McCaysville GA: Music. See S 0000.
 1432 Russia, Voice of: Kaleidoscope. See S 1532.
 1440 USA, WGTG McCaysville GA: Daily Scripture Reading. See M 1440.
 1450 USA, WGTG McCaysville GA: Music. See S 0000.

Fridays

- 1400 USA, WEWN Birmingham AL: The Holy Rosary (Sorrowful). See S 0400.
 1400 Russia, Voice of: News. See S 0200.
 1400 USA, WGTG McCaysville GA: USA Radio News. See S 0200.
 1404 USA, WGTG McCaysville GA: The Gospel Hour. See S 1404.
 1411 Russia, Voice of: Moscow Mailbag. See M 1411.
 1430 USA, WEWN Birmingham AL: The Chaplet of Divine Mercy. See S 0400.
 1430 Russia, Voice of: News in Brief. See S 1430.
 1430 USA, WGTG McCaysville GA: Music. See S 0000.
 1432 Russia, Voice of: Russian by Radio. See W 1432.
 1440 USA, WGTG McCaysville GA: Daily Scripture Reading. See M 1440.
 1450 USA, WGTG McCaysville GA: Music. See S 0000.

Saturdays

- 1400 USA, WEWN Birmingham AL: The Holy Rosary (Glorious). See S 0400.
 1400 Russia, Voice of: News. See S 0200.
 1400 USA, WGTG McCaysville GA: USA Radio News. See S 0200.
 1404 USA, WGTG McCaysville GA: The Gospel Hour. See S 1404.
 1411 Russia, Voice of: Program Preview. A review of programs to be featured in the coming week.
 1430 USA, WEWN Birmingham AL: The Chaplet of Divine Mercy. See S 0400.
 1430 Russia, Voice of: News in Brief. See S 1430.
 1430 USA, WGTG McCaysville GA: The Children's Bible Club. Aunt Caroline with music and Bible teaching for children.
 1432 Russia, Voice of: Audio Book Club. See M 1432.

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FREQUENCIES

1500-1600	Anguilla, Caribbean Beacon	11775am				1500-1526	Romania, R Romania Intl	15335as	17720as		
1500-1600	Australia, Radio	5870pa	5995pa	9415as	9615as	1500-1600	Russia, Voice of Russia WS	4740me	4940me	4975me	7345as
		11660as	11800pa					9595me	9800as	11665me	11835me
1500-1600 vl	Australia, VL8A Alice Spg	2310do				1500-1600 mtwhfa	Seychelles, FEBA Radio	11985me	15350me	15430me	15540me
1500-1600 vl	Australia, VL8K Katherine	2485do				1500-1530 mt fa	Seychelles, FEBA Radio	9810as			
1500-1600 vl	Australia, VL8T Tent Crk	2325do				1500-1600	Singapore, R Corp of Sing	11600as			
1500-1600 vl	Canada, CBC N Quebec Svc	9625do				1500-1600	United Kingdom, BBC WS	6155do			
1500-1600	Canada, CFRX Toronto	6070do						5975as	5990as	6190af	6195as
1500-1600	Canada, CFVP Calgary	6030do						9410eu	9515am	9740as	11750as
1500-1600	Canada, CHNX Halifax	6130do						11865am	11940af	12095as	15220am
1500-1600	Canada, CKZN St John's	6160do						15400af	15485af	15565va	15575va
1500-1600	Canada, CKZU Vancouver	6160do						17705af	17830af	17840am	21470af
1500-1559 s	Canada, R Canada Intl	11855na	13650na					21660af			
1500-1600	China, China Radio Intl	7160as	9785as			1500-1530	United Kingdom, BBC WS	11860af	15420af	17880af	21490af
1500-1600	Costa Rica, RF Peace Intl	7385am	15050am			1500-1600	United Kingdom, UCB	6200eu			
1500-1600	Ecuador, HCJB	12005am	15115am	21455am		1500-1600	USA, KAIJ Dallas TX	13815am			
1500-1600 as	Eqt Guinea, R East Africa	15186af				1500-1600	USA, KJES Mesquite NM	11715na			
1500-1600	Georgia, Voice of Hope	12120as				1500-1600	USA, KTNB Salt Lk City UT	7510am			
1500-1600	Guam, TWR/KTWR	11580as				1500-1600	USA, KWHR Naalehu HI	7510as			
1500-1600 a	Ireland, W Coast R Ireland	6175eu				1500-1600	USA, Voice of America	6160as	7125as	7215as	9645as
1500-1530	Israel, Kol Israel	12080na	15650na					9700me	9760as	15205as	15255va
1500-1600 vl/fas	Italy, IRRS	3985va						15395as			
1500-1600	Japan, R Japan/NHK World	7200af	7240af	9535na	9750as	1500-1600	USA, WEWN Birmingham AL	9455na	11875na	15745eu	
		11730af	15355af			1500-1600	USA, WGTG McCaysville GA	9400am			
1500-1600	Jordan, Radio	11690eu				1500-1600	USA, WHRI Noblesville IN	13760am	15105am		
1500-1510	Liberia, LCM/R Liberia Int	5100do				1500-1600	USA, WJCR Upton KY	7490na			
1500-1600	Malaysia, Radio	7295do				1500-1600	USA, WRMI/R Miami Intl	9955am			
1500-1600 vl	Malaysia, RTM Kuching	7160do				1500-1600	USA, WRNO New Orleans LA	7355am	15420am		
1500-1600 vl	Malaysia, RTM Kota Kinabalu	5980do				1500-1600	USA, WWCN Nashville TN	9475am	12160am	13845am	15685am
1500-1530	Mexico, Radio Mexico Intl	9705na				1500-1600	USA, WYFR Okeechobee FL	11830na	17750ca		
1500-1530	Mongolia, Voice of	9720as	12085au			1500-1530	Vatican State, Vatican R	11635au	13765au		
1500-1515 s	Myanmar, Voice of	5990do				1500-1600	Zambia, Christian Voice	6065af			
1500-1525	Netherlands, Radio	9890as	12090as	15585as		1500-1600 vl	Zambia, R Zambia/ZNBC 1	4910do			
1500-1600 occsnal	New Zealand, R NZ Intl	6100pa				1500-1600 vl	Zambia, R Zambia/ZNBC 2	6165do			
1500-1600	Nigeria, Voice of	7255af				1515-1530 vl	Cyprus, BRT International	6150do			
1500-1557	North Korea, R Pyongyang	3560eu	9640af	9975eu	11335eu	1530-1545	India, All India Radio	6150do	7140do	7410do	9565do
		11735eu	13650me					9835do	9910do	11740do	
1500-1530 s	Norway, Radio Norway Intl	9985as	13805as			1530-1600	Iran, VOIRI	11790as	13605as		
1500-1530 as	Palau, KHBV/Voice of Hope	9985as				1530-1545 sm	Seychelles, FEBA Radio	11600as			
1500-1600 vl	Papua New Guinea, NBC	4890do				1530-1600 mtwhf	Sri Lanka, Sri Lanka BC	9730as			
1500-1600	Philippines, FEBC/R Intl	11995as				1545-1600 sh	Bangladesh, Bangla Betar	4880do			

SELECTED PROGRAMS

Sundays

- 1500 USA, WEWN Birmingham AL: Life on the Rock (encore). Join Jeff Cavins and his weekly guest as they meet at a coffee house to discuss the joys and challenges of being a young Christian in the 90's.
- 1500 Russia, Voice of: News. See S 0200.
- 1500 USA, WGTG McCaysville GA: Sounds of Joy. See S 0300.
- 1511 Russia, Voice of: News and Views. Russian views on news developments.
- 1530 Russia, Voice of: News in Brief. See S 1430.
- 1530 USA, WGTG McCaysville GA: Music. See S 0000.
- 1532 Russia, Voice of: Kaleidoscope. A variety of topics ranging from science and ecology to cultural matters.

Mondays

- 1500 USA, WEWN Birmingham AL: The Catechism Explained. Douglas Bushman discusses Catholic dogma.
- 1500 Russia, Voice of: News. See S 0200.
- 1500 USA, WGTG McCaysville GA: Sermon and Song. A music and inspiration program hosted by evangelist Bennett Collins.
- 1511 Russia, Voice of: News and Views. See S 1511.
- 1515 USA, WGTG McCaysville GA: Music. See S 0000.
- 1530 USA, WEWN Birmingham AL: St. Francis - Mirror of Christ. Father Andrew Apostoli discusses St. Francis and his teachings.
- 1530 Russia, Voice of: News in Brief. See S 1430.
- 1530 USA, WGTG McCaysville GA: Family Altar. See M 0300.
- 1532 Russia, Voice of: Folk Box. One of the top ten entertainment programs (Passport to World Band Radio).
- 1545 USA, WGTG McCaysville GA: Music. See S 0000.

Tuesdays

- 1500 USA, WEWN Birmingham AL: Truth Talks. See T 0200.
- 1500 Russia, Voice of: News. See S 0200.
- 1500 USA, WGTG McCaysville GA: Sermon and Song. See M 1500.
- 1511 Russia, Voice of: News and Views. See S 1511.
- 1515 USA, WGTG McCaysville GA: Music. See S 0000.
- 1530 Russia, Voice of: News in Brief. See S 1430.
- 1530 USA, WGTG McCaysville GA: Family Altar. See M 0300.
- 1532 Russia, Voice of: Yours for the Asking. A 30-minute musical

- request program.
- 1545 USA, WGTG McCaysville GA: Music. See S 0000.

Wednesdays

- 1500 USA, WEWN Birmingham AL: The Choices We Face. Ralph Martin.
- 1500 Russia, Voice of: News. See S 0200.
- 1500 USA, WGTG McCaysville GA: Sermon and Song. See M 1500.
- 1511 Russia, Voice of: News and Views. See S 1511.
- 1515 USA, WGTG McCaysville GA: Music. See S 0000.
- 1530 USA, WEWN Birmingham AL: Scandal of the Cross and Its Triumph. See S 1100.
- 1530 Russia, Voice of: News in Brief. See S 1430.
- 1530 USA, WGTG McCaysville GA: Family Altar. See M 0300.
- 1532 Russia, Voice of: The Jazz Show. The world of Russian jazz.
- 1545 USA, WGTG McCaysville GA: Music. See S 0000.

Thursdays

- 1500 USA, WEWN Birmingham AL: Pillars of Faith (encore). See T 0100.
- 1500 Russia, Voice of: News. See S 0200.
- 1500 USA, WGTG McCaysville GA: Sermon and Song. See M 1500.
- 1511 Russia, Voice of: News and Views. See S 1511.
- 1515 USA, WGTG McCaysville GA: Music. See S 0000.
- 1530 Russia, Voice of: News in Brief. See S 1430.
- 1530 USA, WGTG McCaysville GA: Family Altar. See M 0300.
- 1532 Russia, Voice of: Yours for the Asking. See T 1532.
- 1545 USA, WGTG McCaysville GA: Music. See S 0000.

Fridays

- 1500 USA, WEWN Birmingham AL: LiveWire (encore). Repeat of live call-in program.
- 1500 Russia, Voice of: News. See S 0200.
- 1500 USA, WGTG McCaysville GA: Sermon and Song. See M 1500.
- 1511 Russia, Voice of: News and Views. See S 1511.
- 1515 USA, WGTG McCaysville GA: Music. See S 0000.
- 1530 Russia, Voice of: News in Brief. See S 1430.
- 1530 USA, WGTG McCaysville GA: Family Altar. See M 0300.
- 1532 Russia, Voice of: Music at Your Request. See W 0232.

- 1545 USA, WGTG McCaysville GA: Music. See S 0000.

Saturdays

- 1500 USA, WEWN Birmingham AL: Our Father's Plan. See M 2300.
- 1500 Russia, Voice of: News. See S 0200.
- 1500 USA, WGTG McCaysville GA: USA Radio News. See S 0200.
- 1505 USA, WGTG McCaysville GA: Aunt "B". A dramatized teaching program for Christian youth.
- 1511 Russia, Voice of: News and Views. See S 1511.
- 1530 Russia, Voice of: News in Brief. See S 1430.
- 1532 Russia, Voice of: Timelines. Estelle Winters hosts a variety program with an upbeat flair and an insight into Moscow life.
- 1535 USA, WGTG McCaysville GA: The Adventures of Captain Patch. Patch the Pirate takes the kids for a ride.
- 1550 USA, WGTG McCaysville GA: Music. See S 0000.

DEUTSCHE WELLE PROGRAM CHANGES

Gareth Evans, host of *Germany Today* and *Come to Germany*, left the Voice of Germany to take up a new job in television. Consequently, Deutsche Welle has revamped its program lineup again and they are featured in this month's selected programs. New programs to be aware of are *SciTech*, *Marks and Markets*, *Saturday Review*, *Sunday Review*, *African Kaleidoscope*, and *COOL*.

FREQUENCIES

1600-1700	Algeria, R Algiers Intl	15160me				1600-1700	Swaziland, Trans World R	9500af			
1600-1700	Anguilla, Caribbean Beacon	11775am				1600-1630	Switzerland, Swiss R Intl	12075as	13635as	15530as	
1600-1700	Australia, Radio	5870pa	5995pa	6080pa	9415as	1600-1640	UAE, Radio Dubai	15395me	17630eu		
		9615pa	11660pa			1600-1700	United Kingdom, BBC WS	3255af	3915as	5975as	6190af
1600-1700 vl	Australia, VL8A Alice Spg	2310do						7160as	7275as	9410eu	11750as
1600-1700 vl	Australia, VL8K Katherine	2485do						12095eu	15400af	15485eu	15565me
1600-1700 vl	Australia, VL8T Tent Crk	2325do						15575va	17830af	17840am	21470af
1600-1610	Bangladesh, Bangla Betar	4880do	15520do					21660af			
1600-1700 vl	Canada, CBC N Quebec Svc	9625do				1600-1615	United Kingdom, BBC WS	5990as	6195as	9515am	9740as
1600-1700	Canada, CFRX Toronto	6070do				1600-1700	United Kingdom, UCB	6200eu			
1600-1700	Canada, CFVP Calgary	6030do				1600-1700	USA, KAIJ Dallas TX	13815am			
1600-1700	Canada, CHNX Halifax	6130do				1600-1700	USA, KTNB Salt Lk City UT	15590am			
1600-1700	Canada, CKZN St John's	6160do				1600-1700	USA, KWHR Naalehu HI	7510pa			
1600-1700	Canada, CKZU Vancouver	6160do				1600-1700	USA, Monitor Radio Intl	18930af			
1600-1700	China, China Radio Intl	9565as	15110af	15130af		1600-1700	USA, Voice of America	6035af	6110as	6160as	7125as
1600-1700 as	Costa Rica, Adv World R	9725am	11870am	13750am				7215as	9645as	9700me	9760as
1600-1700	Costa Rica, RF Peace Intl	7385am	15050am					13600af	13710af	15205va	15225af
1600-1627	Czech Rep, Radio Prague	5930eu	17485af					15255va	15395as	15410af	15445af
1600-1700	Ethiopia, Radio	7165af	9560af	11800af				17895af			
1600-1654	France, Radio France Intl	11615me	11700af	12015af	15210af	1600-1700	USA, WEWN Birmingham AL	9455na	11875na	15745eu	
		15460af	15530af			1600-1700	USA, WGTG McCaysville GA	9400am			
1600-1700	Georgia, Voice of Hope	12120as				1600-1700	USA, WHRI Noblesville IN	13760am	15105am		
1600-1650	Germany, Deutsche Welle	6170as	7130af	7225as	7305as	1600-1700	USA, WJCR Upton KY	7490na			
		9735af	9875as	11810af	13690as	1600-1700	USA, WRMI/R Miami Intl	9955am			
		17800af				1600-1700	USA, WRNO New Orleans LA	7355am	15420am		
1600-1700	Guam, AWR/KSDA	7455as				1600-1700	USA, WWCN Nashville TN	9475am	12160am	13845am	15685am
1600-1630	Guam, TWR/KTWR	11580as				1600-1700	USA, WYFR Okeechobee FL	11550as	11705na	11830na	15695eu
1600-1630	Iran, VOIRI	11790as	13605as					17750eu	21525af	21745eu	
1600-1700 vl/fas	Italy, IRRS	3985va				1600-1630	Vatican State, Vatican R	5885eu	7250eu	9645eu	11810va
1600-1700	Jordan, Radio	11690eu				1600-1700	Vietnam, Voice of	9840af	15010af		
1600-1610	Lesotho, Radio Lesotho	4800do				1600-1700 vl	Zambia, Christian Voice	3330af	4965af		
1600-1700	Malaysia, Radio	7295do				1600-1700 vl	Zambia, R Zambia/ZNBC 1	4910do			
1600-1630	Mexico, Radio Mexico Intl	9705na				1600-1700 vl	Zambia, R Zambia/ZNBC 2	6165do			
1600-1650 occsnal	New Zealand, R NZ Intl	6100pa				1610-1615	Bangladesh, Bangla Betar	4880do			
1600-1700	Nigeria, Voice of	7255af				1615-1630 mtwhf	Estonia, Radio	5925eu			
1600-1630	Pakistan, Radio	6070af	7485me	9515me	9600af	1615-1700 as	United Kingdom, BBC WS	9515am	11860af	15420af	
		11565me				1630-1655	Austria, R Austria Intl	6155eu	9655eu	11855me	13710as
1600-1700 vl	Papua New Guinea, NBC	4890do						13730af			
1600-1700	Russia, Voice of Russia WS	4740me	4940me	4975me	7345as	1630-1657	Canada, R Canada Intl	7150as	9550as		
		9440af	9595me	9675me	11775af	1630-1700	Egypt, Radio Cairo	15255af			
		11835me	12025af	12035af	15320me	1630-1700	Slovakia, AWR Europe	11600af	13580me		
		15430af	15460me	15540me	17525me	1630-1700	Slovakia, R Slovakia Intl	5915eu	6055eu	7345eu	
1600-1700 sm	Russia, Voice of Russia WS	7325me	9730eu			1645-1700 irreg	Afghanistan, Radio	7200as			
1600-1630	S Africa, Channel Africa	6120af	9685af			1645-1700	Israel, Kol Israel	9435eu	12080eu	15650eu	
1600-1700	Singapore, R Corp of Sing	6155do				1645-1700	Tajikistan, Radio Dushanbe	7245as	9905as		
1600-1700	South Korea, R Korea Intl	5975eu	9515af	9870af		1650-1700	Eqt Guinea, Radio Africa	15186af			
						1650-1700 mtwhf	New Zealand, R NZ Intl	6145pa			

SELECTED PROGRAMS

Sundays

- 1600 USA, WEWN Birmingham AL: Voyage of Faith. Father Robert Lewis uses his captivating stories of voyages at sea to demonstrate the challenges of Christianity.
- 1600 Germany, Deutsche Welle: News. See S 0100.
- 1600 Switzerland, Swiss R Intl: News. See S 0100.
- 1600 USA, WGTG: Echoes of Grace. An archived Sunday sermon.
- 1605 Switzerland, Swiss R Intl: Newsnet. See S 0105.
- 1606 Germany, Deutsche Welle: Religion and Society. See S 1106.
- 1618 Germany, Deutsche Welle: Arts on the Air. Reports and interviews on major cultural events and developments.
- 1618 Germany, Deutsche Welle: COOL. See S 1118.
- 1618 Germany, Deutsche Welle: Feature of the Month (1). A special feature on important developmental issues of our time.
- 1630 USA, WEWN Birmingham AL: The Gospel of the Holy Spirit. Fr. Alfred McBride teaches on the acts of the apostles.

Mondays

- 1600 USA, WEWN Birmingham AL: The Gospel of Life. Father Richard Hogan expounds upon the principles in the Pope's encyclical on life.
- 1600 Germany, Deutsche Welle: News. See S 0100.
- 1600 Switzerland, Swiss R Intl: News. See S 0100.
- 1600 USA, WGTG McCaysville GA: The Truck Driver Special. Chuck Rogers preaches from Atlanta.
- 1605 Switzerland, Swiss R Intl: Newsnet. See S 0105.
- 1606 Germany, Deutsche Welle: NewsLink. See M 1106.
- 1628 USA, WEWN Birmingham AL: Franciscan University Connection. See M 0030.
- 1633 Germany, Deutsche Welle: Africa Report. See M 1133.
- 1633 Germany, Deutsche Welle: Asia-Pacific Report. Correspondent reports, interviews and background news from the Asia-Pacific region.
- 1642 USA, WEWN: Food for the Journey. See M 0044.
- 1645 USA, WGTG McCaysville GA: Bible for Today. Information about the King James edition of the Bible.

Tuesdays

- 1600 USA, WEWN Birmingham AL: Behold Your Mother. Mark Miravalle focuses on Mary's role in the Catholic Church.
- 1600 Germany, Deutsche Welle: News. See S 0100.
- 1600 Switzerland, Swiss R Intl: News. See S 0100.
- 1600 USA, WGTG: The Truck Driver Special. See M 1600.
- 1605 Switzerland, Swiss R Intl: Newsnet. See S 0105.
- 1606 Germany, Deutsche Welle: NewsLink. See M 1106.
- 1628 USA, WEWN Birmingham AL: Franciscan University Connection. See M 0030.
- 1633 Germany, Deutsche Welle: Africa Report. See M 1133.
- 1633 Germany, Deutsche Welle: Asia-Pacific Report. See M 1633.
- 1642 USA, WEWN: In Season - Out of Season. See M 1244.
- 1645 USA, WGTG McCaysville GA: Bible for Today. See M 1645.

Wednesdays

- 1600 USA, WEWN Birmingham AL: Pro-Life Update. See W 0000.
- 1600 Germany, Deutsche Welle: News. See S 0100.
- 1600 Switzerland, Swiss R Intl: News. See S 0100.
- 1600 USA, WGTG: The Truck Driver Special. See M 1600.
- 1605 Switzerland, Swiss R Intl: Newsnet. See S 0105.
- 1606 Germany, Deutsche Welle: NewsLink. See M 1106.
- 1628 USA, WEWN Birmingham AL: Franciscan University Connection. See M 0030.
- 1633 Germany, Deutsche Welle: Africa Report. See M 1133.
- 1633 Germany, Deutsche Welle: Asia-Pacific Report. See M 1633.
- 1642 USA, WEWN: Food for the Journey. See M 0044.
- 1645 USA, WGTG McCaysville GA: Bible for Today. See M 1645.

Thursdays

- 1600 USA, WEWN Birmingham AL: Our Lady in Scripture and Tradition. See H 0000.
- 1600 Germany, Deutsche Welle: News. See S 0100.
- 1600 Switzerland, Swiss R Intl: News. See S 0100.
- 1600 USA, WGTG: The Truck Driver Special. See M 1600.
- 1605 Switzerland, Swiss R Intl: Newsnet. See S 0105.
- 1606 Germany, Deutsche Welle: NewsLink. See M 1106.

- 1628 USA, WEWN Birmingham AL: Franciscan University Connection. See M 0030.
- 1633 Germany, Deutsche Welle: Africa Report. See M 1133.
- 1633 Germany, Deutsche Welle: Asia-Pacific Report. See M 1633.
- 1642 USA, WEWN: In Season - Out of Season. See M 1244.
- 1645 USA, WGTG McCaysville GA: Bible for Today. See M 1645.

Fridays

- 1600 USA, WEWN Birmingham AL: Fatima and the Family. Fr. Robert Fox of Fatima Family Apostolate teaches the story, history and message of Fatima.
- 1600 Germany, Deutsche Welle: News. See S 0100.
- 1600 Switzerland, Swiss R Intl: News. See S 0100.
- 1600 USA, WGTG: The Truck Driver Special. See M 1600.
- 1605 Switzerland, Swiss R Intl: Newsnet. See S 0105.
- 1606 Germany, Deutsche Welle: NewsLink. See M 1106.
- 1628 USA, WEWN Birmingham AL: Franciscan University Connection. See M 0030.
- 1633 Germany, Deutsche Welle: Africa Report. See M 1133.
- 1633 Germany, Deutsche Welle: Asia-Pacific Report. See M 1633.
- 1642 USA, WEWN: Food for the Journey. See M 0044.
- 1645 USA, WGTG McCaysville GA: Bible for Today. See M 1645.

Saturdays

- 1600 USA, WEWN Birmingham AL: Successful Fathering in the 90's. See F 0000.
- 1600 Germany, Deutsche Welle: News. See S 0100.
- 1600 Switzerland, Swiss R Intl: News. See S 0100.
- 1600 USA, WGTG McCaysville GA: Mr. Bill. A Saturday morning program for children.
- 1605 Switzerland, Swiss R Intl: Newsnet. See S 0105.
- 1606 Germany, Deutsche Welle: Talking Point. See A 1106.
- 1615 Switzerland, Swiss R Intl: Capital Letters (2/4). See S 0115.
- 1615 Switzerland, Swiss R Intl: Sounds Good (3/5). See S 0115.
- 1615 Switzerland, Swiss R Intl: The Name Game (1). See S 0115.
- 1630 USA, WEWN: Winners for Christ. See S 0430.
- 1633 Germany, Deutsche Welle: SciTech. See S 0333.

FREQUENCIES

1700-1800	Anguilla, Caribbean Beacon	11775am			
1700-1800	Australia, Radio	5870pa	6080pa	6355va	9415va
		9615as	11880pa		
1700-1800 vl	Australia, VL8A Alice Spg	2310do			
1700-1800 vl	Australia, VL8K Katherine	2485do			
1700-1800 vl	Australia, VL8T Tent Crk	2325do			
1700-1800 vl	Canada, CBC N Quebec Svc	9625do			
1700-1800	Canada, CFRX Toronto	6070do			
1700-1800	Canada, CFVP Calgary	6030do			
1700-1800	Canada, CHNX Halifax	6130do			
1700-1800	Canada, CKZN St John's	6160do			
1700-1800	Canada, CKZU Vancouver	6160do			
1700-1800	China, China Radio Intl	5220af	7150af	7160af	7405af
		9570af	11910af		
1700-1800	Costa Rica, RF Peace Intl	15050am			
1700-1727	Czech Rep, Radio Prague	5930eu	15640af		
1700-1800	Egypt, Radio Cairo	15255af			
1700-1800	Eq Guinea, Radio Africa	15186af			
1700-1730	France, Radio France Intl	15210af	15460me		
1700-1800 vl	Italy, IRRS	3985va			
1700-1800	Japan, R Japan/NHK World	6035na	7110na	7200na	7225na
		9535na	9835na	11730as	11880as
1700-1730	Jordan, Radio	11690eu			
1700-1800 mtwhf	New Zealand, R NZ Intl	6145pa			
1700-1800 vl	Papua New Guinea, NBC	4890do			
1700-1800	Russia, Voice of Russia WS	7290eu	7345as	7350eu	7440af
		9440af	9615af	9730eu	9765eu
		9775eu	9880eu	9975af	11685af
		11725af	11775af	11850af	11945af
		12025af	15350af	15430eu	17525me
		17875af			
1700-1730	S Africa, Channel Africa	11900af			
1700-1730	Slovakia, AWR Europe	15620af			
1700-1730	Spain, R Exterior Espana	9620eu			
1700-1800	Swaziland, Trans World R	9500af			
1700-1730	Switzerland, Swiss R Intl	9905eu			
1700-1800	United Kingdom, BBC WS	3255af	5975as	6090va	6190af
		6195eu	7160as	9410eu	9510as
		11750as	12095eu	15400af	15420af
		15485eu	15575va	17830af	17940af
1700-1745	United Kingdom, BBC WS	3915as	9630af	11860af	
1700-1800	United Kingdom, UCB	6200eu			
1700-1800	USA, KAIJ Dallas TX	13815am			
1700-1800	USA, KTNB Salt Lk City UT	15590am			
1700-1800	USA, KWHR Naalehu HI	7510pa			
1700-1800	USA, Monitor Radio Intl	18930af			
1700-1800	USA, Voice of America	6110as	6160as	7125as	7170as
		9645as	9700me	9760af	15255va
		15395as	15445af	17895af	
1700-1800 mtwhf	USA, Voice of America	5990as	6045as	7150as	9550as
		9770as	11870as	15135as	
1700-1800	USA, WEWN Birmingham AL	11875na	13615na	15745na	
1700-1800	USA, WGTG McCaysville GA	9400am			
1700-1800	USA, WHRI Noblesville IN	9495am	13760am		
1700-1800	USA, WJCR Upton KY	7490na			
1700-1800 smtwhf	USA, WMLK Bethel PA	9465va			
1700-1800	USA, WRMI/R Miami Intl	9955am			
1700-1800	USA, WRNO New Orleans LA	7355am	15420am		
1700-1800	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
1700-1800	USA, WYFR Okeechobee FL	11550as	15695eu	21745eu	
1700-1800	Zambia, Christian Voice	3330af	4965af		
1700-1800 vl	Zambia, R Zambia/ZNBC 1	4910do			
1700-1800 vl	Zambia, R Zambia/ZNBC 2	6165do			
1700-1800 vl	Zimbabwe, Zimbabwe BC	4828do			
1730-1800	Georgia, Radio	6180eu			
1730-1800	Guam, AWR/KSDA	9370as			
1730-1800	Netherlands, Radio	6020af	7120af	11655af	
1730-1800	Philippines, R Pilipinas	11720me	11890me	15190me	
1730-1756	Romania, R Romania Intl	9550af	11940af	15340af	
1730-1745 mtwh	Swaziland, Trans World R	3200af			
1730-1800	Sweden, Radio	6065eu	13800va		
1730-1800 s	Sweden, Radio	9590eu	13800va		
1730-1759	Vatican State, Vatican R	11625af	15570af	17550af	
1745-1800	Bangladesh, Bangla Betar	7190as	9570eu	15520do	
1745-1800	India, All India Radio	7410eu	9950eu	11620af	11935af
		13780do	15075af		
1745-1800	Swaziland, Trans World R	3200af			
1755-1800	Georgia, Voice of Hope	9310eu			

1800 UTC

1800-1900	Anguilla,Caribbean Beacon	11775am			
1800-1900 mtwhf	Argentina, RAE	15345eu			
1800-1900	Australia, Radio	6080as	9415va	9615as	11880pa
1800-1900 vl	Australia, VL8A Alice Spg	2310do			
1800-1900 vl	Australia, VL8K Katherine	2485do			

1800-1900 vl	Australia, VL8T Tent Crk	2325do			
1800-1900	Bangladesh, Bangla Betar	7190eu	9570as	15520do	
1800-1900	Brazil, Radio Bras	15265eu			
1800-1900	Canada, CFRX Toronto	6070do			
1800-1900	Canada, CFPV Calgary	6030do			
1800-1900	Canada, CHNX Halifax	6130do			
1800-1900	Canada, CKZN St John's	6160do			
1800-1900	Canada, CKZU Vancouver	6160do			
1800-1900	Costa Rica, RF Peace Intl	15050am			
1800-1830	Egypt, Radio Cairo	15255af			
1800-1900	Eqt Guinea, Radio Africa	15186af			
1800-1900	Georgia, Voice of Hope	9310eu			
1800-1900	India, All India Radio	7410eu	9650eu	9950af	11620af
		11935me	13770as	13780as	15075as
1800-1900 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
1800-1900	Kuwait, Radio	11990na			
1800-1900 s	Morocco, RTVM Marocaine	17815af			
1800-1825	Netherlands, Radio	6020af	7120af	11655af	
1800-1851 mtwhf	New Zealand, R NZ Intl	6145pa			
1800-1857	North Korea, R Pyongyang	4405eu	6575eu	9345am	11700am
		13760am			
1800-1830 s	Norway, Radio Norway Intl	7485eu	9590me	15220af	
1800-1900 vl	Papua New Guinea, NBC	4890do			
1800-1900 vl	Philippines, R Pilipinas	11720me	11890me	15190me	
1800-1855	Poland, Polish R Warsaw	6000eu	6095eu	7285eu	
1800-1900	Russia, Voice of Russia WS	7440af	9440af	9765eu	9775eu
		9865eu	9880eu	9945af	11775af
		17875af			
1800-1900	Sudan, Radio Omdurman	9200af			
1800-1900	Swaziland, Trans World R	3200af			
1800-1830	Swaziland, Trans World R	9500af			
1800-1900	United Kingdom, BBC WS	3255af	6180eu	6190af	6195eu
		9410va	12095eu	15400af	15420af
		15485va	15575va	17830af	
1800-1830	United Kingdom, BBC WS	5975as	6090va	9510as	21490af
1800-1900	USA, KAIJ Dallas TX	13815am			
1800-1900	USA, KTBN Salt Lk City UT	15590am			
1800-1900	USA, KWHR Naalehu HI	7510pa			
1800-1900	USA, Monitor Radio Intl	9385af	11550eu	13770eu	18930af
1800-1900	USA, Voice of America	7415af	9760af	11975af	15410af
		15580af	17895af		
1800-1900	USA, WEWN Birmingham AL	11875na	13615na	15745eu	
1800-1900	USA, WGTG McCaysville GA	9400am			
1800-1900	USA, WHRI Noblesville IN	9495am	13760eu		
1800-1900	USA, WINB Red Lion PA	15715af			
1800-1900	USA, WJCR Upton KY	7490na			
1800-1900 smtwhf	USA, WMLK Bethel PA	9465va			
1800-1900	USA, WRMI/R Miami Intl	9955am			
1800-1900	USA, WRNO New Orleans LA	7355am	15420am		
1800-1900	USA, WVCR Nashville TN	9475am	12160am	13845am	15685am
1800-1900	USA, WYFR Okeechobee FL	15695eu	17555eu		
1800-1827	Vietnam, Voice of	9840eu	15010eu		
1800-1900	Yemen, Radio Aden	9780do			
1800-1900	Zambia, Christian Voice	3330af	4965af		
1800-1900 vl	Zambia, R Zambia/ZNBC 1	4910do			
1800-1900 vl	Zambia, R Zambia/ZNBC 2	6165do			
1800-1900 vl	Zimbabwe, Zimbabwe BC	4828do			
1805-1830	Malawi, MBC	5993do			
1830-1900 vl	Cyprus, BRT International	6150do			
1830-1900 mtwhf	Georgia, Radio	6080eu			
1830-1900	Netherlands, Radio	6020af	7120af	9895af	11655af
		15315af	17605af		
1830-1900 w	Saipan, FEBC/KFBS	9465as			
1830-1900	Slovakia, R Slovakia Intl	5915eu	6055eu	7345eu	
1830-1835	Somalia, Radio Mogadishu	6732do			
1830-1900	United Kingdom, BBC WS	6005af	9630af		
1830-1900	USA, Voice of America	7170as	7330af	9860af	
1833-1900	Cote D' Ivoire, RDTV	11920do			
1840-1850	Greece, Voice of	11645af	15150af		
1845-1900	Albania, R Tirana Intl	7270eu	9570eu		
1845-1900 mtwhf	Armenia, Voice of	4810eu	4990me		
1845-1900 irreg s	Mal, RDTV Malienne	4783do	4835do	5995do	
1852-1900 smtwh	New Zealand, R NZ Intl	9875pa			



Your Name in Lights!

... or at least in ink within the *Monitoring Times* Shortwave Guide. Please send us your "best catches" on the worldwide shortwave bands — QSLs, that is — and we will try to use them in future issues of *MT*. Your QSLs will be returned.

FREQUENCIES

1900-2000	Anguilla, Caribbean Beacon	11775am				2000-2100	Bulgaria, Radio	9700eu	11720eu
1900-2000	Australia, Radio	6080pa	6355va	7240pa	9415va	2000-2100	Canada, CFRX Toronto	6070do	
		9615as	11880pa			2000-2100	Canada, CFVP Calgary	6030do	
1900-2000 vl	Australia, VL8A Alice Spg	2310do				2000-2100	Canada, CHNX Halifax	6130do	
1900-2000 vl	Australia, VL8K Katherine	2485do				2000-2100	Canada, CKZN St John's	6160do	
1900-2000 vl	Australia, VL8T Tent Crk	2325do				2000-2100	Canada, CKZU Vancouver	6160do	
1900-1925 mtwhfa	Belgium, R Vlaanderen Int	5910eu	13645af			2000-2100	Canada, R Canada Intl	5995va	7235va
1900-1920	Brazil, Radio Bras	15265eu						13670va	15150va
1900-2000	Canada, CFRX Toronto	6070do						17870va	
1900-2000	Canada, CFVP Calgary	6030do				2000-2100	China, China Radio Intl	5220eu	6950eu
1900-2000	Canada, CHNX Halifax	6130do						9920eu	15110af
1900-2000	Canada, CKZN St John's	6160do				2000-2100	Costa Rica, RF Peace Intl	15050am	
1900-2000	Canada, CKZU Vancouver	6160do				2000-2100 vl	Cyprus, BRT International	6150do	
1900-2000	China, China Radio Intl	6955af	9440af	11515af		2000-2027	Czech Rep, Radio Prague	5930eu	11600au
1900-2000	Costa Rica, RF Peace Intl	15050am				2000-2100	Ecuador, HCJB	12015eu	21455am
1900-1930	Cote D' Ivoire, RDTV	11920do				2000-2100	Egt Guinea, Radio Africa	15186af	
1900-2000	Ecuador, HCJB	12015am	21455am			2000-2030 m	Estonia, Radio	5925eu	
1900-2000	Egt Guinea, Radio Africa	15186af				2000-2030	Finland, YLE/R Finland	6120eu	9855eu
1900-1950	Germany, Deutsche Welle	7250af	9640af	9670af	9735af	2000-2100	Georgia, Voice of Hope	9310eu	
		11785af	11810af	13790af		2000-2050	Germany, Deutsche Welle	7170eu	9615eu
		7430eu	9375eu			2000-2015 t	Germany, Universal Life	5890eu	
		5980am				2000-2030	Ghana, Ghana Broadc Corp	3366do	4915do
		7410eu	9650eu	9950me	11620u	2000-2100	Guatemala, Adv World R	5980am	
		11935af	13770as	13780as	15075as	2000-2030	Hungary, Radio Budapest	3975eu	7155eu
		15625af				2000-2100	Indonesia, Voice of	9525as	
		3985va				2000-2030	Iran, VOIRI	7260eu	9022eu
		4885do	4935do	6150do		2000-2100	Iraq, Radio Iraq Intl	11785eu	
		11990eu				2000-2025	Israel, Kol Israel	7465na	9435na
		5100do				2000-2100 vl	Kenya, Kenya Broadc Corp	4885do	4935do
		9765eu	9810am	12060me		2000-2100	Kuwait, Radio	11990eu	
		6020af	7120af	9895af	11655af	2000-2030 as	Latvia, Radio	5935eu	
		15315af	17605af			2000-2030	Mexico, Radio Mexico Intl	9705na	
		9875pa				2000-2025	Netherlands, Radio	6020af	7120af
		7255af						15315af	17605af
		6520af	9600af	9975af		2000-2051 smtwh	New Zealand, R NZ Intl	9875pa	
		4890do				2000-2058 a	New Zealand, R NZ Intl	9875pa	
		11720me	11890me	15190me		2000-2100 f	New Zealand, R NZ Intl	9875pa	
		7105af	7195eu	9550eu	9690eu	2000-2005	Nigeria, FRCN/Radio	3326do	4770do
		11810eu	11940af			2000-2100 vl	Papua New Guinea, NBC	4890do	4990do
		7290eu	7295af	7350eu	9440af	2000-2030 mtwhf	Portugal, R Portugal Intl	7110eu	9780eu
		9675af	9775eu	9785af	9810eu	2000-2100	Russia, Voice of Russia WS	7290eu	7350eu
		9865eu	9880eu	9945eu	9975af			9810eu	9865eu
		11775af	11945af	11965af				17875af	
		5020do				2000-2030	Serbia, R Yugoslavia	7230au	
		5975eu	7275as			2000-2015	Sierra Leone, SLBS	3316do	
		3200af				2000-2100 vl	Solomon Islands, SIBC	5020do	
		6165eu				2000-2015 irreg	Somalia, Radio Mogadishu	6870af	
		7210eu	9655eu	11905eu		2000-2100 mtwhf	Spain, R Exterior Espana	6125eu	11775af
		3255af	6005af	6180eu	6190af	2000-2015	Swaziland, Trans World R	3200af	
		6195va	9410af	9630af	9740as	2000-2030	Switzerland, Swiss R Intl	9885af	12075af
		11835af	12095eu	15400af	15485va	2000-2030	Turkey, Voice of	9445eu	13695na
		15575va	17830af			2000-2015	Uganda, Radio	4976do	
		6200eu				2000-2100	United Kingdom, BBC WS	3255af	5975as
		13815am						6190af	6195va
		15385na						11750am	11835af
		15590am						15485af	15575va
		17555pa				2000-2100	United Kingdom, UCB	6200eu	
		9385af	11550eu	13770eu	17510af	2000-2100	USA, KAIJ Dallas TX	13815am	
		6035af	7325af	7415af	9525pa	2000-2100	USA, KATN Salt Lk City UT	15590am	
		9760af	11870pa	11975af	15180pa	2000-2100	USA, KWHR Naalehu HI	17555pa	
		15410af	15445af	15580af		2000-2100	USA, Monitor Radio Intl	11550eu	11860au
		4950af				2000-2030	USA, Voice of America	4950af	6035af
		11875na	13615na	15745na				9760af	7375af
		9400am						15410af	7415af
		9495am	13760eu					17755af	15580af
		15715af				2000-2100	USA, WEWN Birmingham AL	11875na	
		7490na				2000-2100	USA, WGTG McCaysville GA	9400am	
		9465va				2000-2100	USA, WHRI Noblesville IN	9495am	13760eu
		9955am				2000-2100	USA, WINB Red Lion PA	15715eu	
		7355am	15420am			2000-2100	USA, WJCR Upton KY	7490na	
		9475am	12160am	13845am	15685am	2000-2100 smtwhf	USA, WMLK Bethel PA	9465va	
		17555af				2000-2100	USA, WRMI/R Miami Intl	9955am	
		9840eu	15010eu			2000-2100	USA, WRNO New Orleans LA	7355am	15420am
		3330af	4965af			2000-2100	USA, WWCR Nashville TN	9475am	12160am
		4910do				2000-2100	USA, WYFR Okeechobee FL	17555eu	17845af
		6165do				2000-2010	Vatican State, Vatican R	4005eu	5885eu
		4828do						9660af	11625af
		5895eu	7165eu	9595va	13830na	2000-2100	Zambia, Christian Voice	3330af	4965af
		12060eu				2000-2100 vl	Zambia, R Zambia/ZNBC 2	6165do	
		6150do				2000-2100 vl	Zimbabwe, Zimbabwe BC	4828do	
		6010eu	7105eu	7205eu	7210eu	2005-2100	Syria, Radio Damascus	12085na	13610eu
		11910eu				2010-2030	Vatican State, Vatican R	7365af	9660af
		7290eu	9022eu			2015-2030	Namibia, NBC	3270do	
		9720as	12015as			2025-2045	Italy, RAI Intl	7120na	9710na
		6100eu	9720af			2030-2100	Armenia, Voice of	7480eu	9965eu
		6065eu				2030-2100	Cuba, Radio Havana	13715eu	13725eu
		9445eu	13695na	9670eu		2030-2100	Egypt, Radio Cairo	15375af	
		6015eu	7230eu			2030-2100	Georgia, Radio	11760eu	
		5890eu				2030-2100	Germany, Adventist World R	9830eu	
		4005eu	5885eu	7250eu	9645eu	2030-2100	Iran, VOIRI	6165pa	6175pa
		9875pa				2030-2100	Poland, Polish R Warsaw	6035eu	6095eu
						2030-2100	Slovakia, AWR Europe	11610af	
						2030-2100 as	Sweden, Radio	6065as	13625as
						2030-2045	Thailand, Radio	9655eu	9680eu
						2030-2100 as	USA, Voice of America	4950af	
						2030-2100	Uzbekistan, R Tashkent	9540eu	9545eu
						2030-2057	Vietnam, Voice of	9840eu	12020eu
						2045-2100	India, All India Radio	7150eu	7410eu
								11620eu	11715pa
						2052-2100 smtwh	New Zealand, R NZ Intl	11735pa	
						2059-2100 a	New Zealand, R NZ Intl	11735pa	

2000 UTC

2000-2100	Algeria, R Algiers Intl	15160af			
2000-2100	Angola, Radio Nacional	3355do	9535do		
2000-2100	Anguilla, Caribbean Beacon	11775am			
2000-2100	Australia, Radio	9415va	9615as	11880pa	
2000-2100 vl	Australia, VL8A Alice Spg	2310do			
2000-2100 vl	Australia, VL8K Katherine	2485do			
2000-2100 vl	Australia, VL8T Tent Crk	2325do			

FREQUENCIES

2100-2130	Albania, R Tirana Intl	7110eu	9515eu		
2100-2200	Anguilla, Caribbean Beacon	11775am			
2100-2200	Australia, Radio	7240pa	9415va	9615as	9660pa
		11695pa	12080pa	17795pa	
2100-2130	Australia, Radio	6355va			17795pa
2100-2130 vl	Australia, VL8A Alice Spg	2310do			
2100-2130 vl	Australia, VL8K Katherine	2485do			
2100-2200 vl	Australia, VL8K Katherine	5025do			
2100-2130 vl	Australia, VL8T Tent Crk	2325do			
2100-2200 vl	Australia, VL8T Tent Crk	4910do			
2100-2115 vl	Cameroon, Radio Cameroon	4850do			
2100-2200 vl	Cameroon, Radio Garoua	5010do			
2100-2200 vl	Canada, CBC N Quebec Svc	9625do			
2100-2200	Canada, CFRX Toronto	6070do			
2100-2200	Canada, CFVP Calgary	6030do			
2100-2200	Canada, CHNX Halifax	6130do			
2100-2200	Canada, CKZN St John's	6160do			
2100-2200	Canada, CKZU Vancouver	6160do			
2100-2130	Canada, R Canada Intl	5995va	7235va	11690va	13650va
		13670va	15150va	15325va	17820va
2100-2130	China, China Radio Intl	3985eu	5220eu	6950eu	9920eu
		11715af	15110af		
2100-2200	Costa Rica, RF Peace Intl	15050am			
2100-2130	Cuba, Radio Havana	13715eu	13725eu		
2100-2200 vl	Cyprus, BRT International	6150do			
2100-2200	Ecuador, HCJB	12015eu	21455am		
2100-2200	Egypt, Radio Cairo	15375af			
2100-2200	Eqt Guinea, Radio Africa	15186af			
2100-2107	Georgia, Voice of Hope	9310eu			
2100-2150	Germany, Deutsche Welle	7115as	9665as	9670as	9735af
		9765as	11785as	11865af	15135va
2100-2130	Germany, Adventist World R	9830af			
2100-2200	India, All India Radio	7150eu	7410eu	9910eu	9950eu
		11620au	11715au		
2100-2130	Iran, VOIRI	6165pa	6175pa		
2100-2200 vl	Italy, IRRS	3955va			
2100-2200	Japan, R Japan/NHK World	6035as	9535na	13630as	
2100-2107 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
2100-2200	Lebanon, Voice of Hope	9960va			
2100-2115	Liberia, LCN/R Liberia Int	5100do			
2100-2130	Mexico, Radio Mexico Intl	9705na			
2100-2107	Namibia, NBC	3270do	3290do		
2100-2200 smtwh	New Zealand, R NZ Intl	11735pa			
2100-2106 f	New Zealand, R NZ Intl	9875pa			
2100-2200	Nigeria, FRCN/Radio	3326do	4770do	4990do	
2100-2157	North Korea, R Pyongyang	4405eu	6575eu	9345am	11700am
		13760am			
2100-2200 vl	Papua New Guinea, NBC	4890do			
2100-2125	Poland, Polish R Warsaw	6035eu	6095eu	7285eu	
2100-2156	Romania, R Romania Intl	7105eu	7195eu	9690eu	11810eu
2100-2200	Russia, Voice of Russia WS	7350eu	7370eu	7440eu	9620eu
		9665eu	9775eu	9810eu	9880eu
		13815eu			
2100-2130	Slovakia, AWR Europe	6055eu	11610af		
2100-2200 vl	Solomon Islands, SIBC	5020do			
2100-2200	South Korea, R Korea Intl	6480eu	15575eu		
2100-2130	South Korea, R Korea Intl	3970eu			
2100-2200 as	Spain, R Exterior Espana	6125eu	11775af		
2100-2155	Syria, Radio Damascus	12085na	13610eu		
2100-2110	Uganda, Radio	4976do			
2100-2200	United Kingdom, BBC WS	3255af	3915as	3955eu	5965as
		5975as	6005af	6180eu	6190af
		6195va	7325va	9410eu	9630va
		11750sa	11835af	11945as	12095eu
		15400af			
2100-2130	United Kingdom, BBC WS	9630af	15485af		
2100-2145	United Kingdom, BBC WS	11680sa			
2100-2200	United Kingdom, UCB	6200eu			
2100-2200	USA, KAIJ Dallas TX	13815am			
2100-2200	USA, KTBN Salt Lk City UT	15590am			
2100-2200	USA, KWHR Naalehu HI	17555pa			
2100-2200	USA, Monitor Radio Intl	11550va	13770eu		
2100-2200	USA, Voice of America	6035af	6040me	7375af	7415af
		9535af	9760eu	11870pa	11975af
		15185as	15410af	15445af	15580af
		17725af	17735as		
2100-2200	USA, WEWN Birmingham AL	5825na	13615na	15745na	
2100-2200	USA, WGTG McCaysville GA	9400am			
2100-2200	USA, WHRI Noblesville IN	9495am			
2100-2200	USA, WINB Red Lion PA	13790eu			
2100-2200	USA, WJCR Upton KY	7490na			
2100-2200 smtwhf	USA, WMLK Bethel PA	9465va			
2100-2200	USA, WRMI/R Miami Intl	9955am			
2100-2200	USA, WRNO New Orleans LA	7355am	15420am		
2100-2200	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
2100-2200	USA, WYFR Okeechobee FL	17555eu	17845eu	21525eu	
2100-2200	Zambia, Christian Voice	3330af	4965af		
2100-2200 vl	Zambia, R Zambia/ZNBC 1	4910do			
2100-2200 vl	Zambia, R Zambia/ZNBC 2	6165do			
2100-2200 vl	Zimbabwe, Zimbabwe BC	4828do			
2107-2200 f	New Zealand, R NZ Intl	11735pa			
2115-2200	Egypt, Radio Cairo	9900eu			
2115-2130	United Kingdom, BBC WS	6175am	15390am	17715am	
2120-2200	Sweden, Radio	6065eu	9430af		
2125-2135 mtwhf	Latvia, Radio	5935eu			

2130-2200	Australia, Radio	13755pa			
2130-2155	Austria, R Austria Intl	5945eu			
2130-2200	China, China Radio Intl	5220eu	6155eu	13730af	
2130-2157	Czech Rep, Radio Prague	11600af	6950eu	9920eu	
2130-2200	Ghana, Ghana Broadc Corp	3366do			
2130-2200	Guam, AWR/KSDA	15310as			
2130-2200	Malawi, MBC	3380do			
2130-2200	South Korea, R Korea Intl	6480eu	15575eu		
2130-2200	Uzbekistan, R Tashkent	9540as	9545me		
2145-2200 a	Greece, Voice of	7480au	9425au		

2200 UTC

2200-2300	Anguilla, Caribbean Beacon	11775am			
2200-2300	Australia, Radio	9660pa	11695pa	12080pa	13755pa
		15510as	17795pa		
2200-2300 s	Australia, Radio	117750pa			
2200-2300 vl	Australia, VL8K Katherine	5025do			
2200-2300 vl	Australia, VL8T Tent Crk	4910do			
2200-2225	Belgium, R Vlaanderen Int	5910eu			
2200-2300	Bulgaria, Radio	9700eu	11720eu		
2200-2300	Canada, CBC N Quebec Svc	9625do			
2200-2300	Canada, CFRX Toronto	6070do			
2200-2300	Canada, CFVP Calgary	6030do			
2200-2300	Canada, CHNX Halifax	6130do			
2200-2300	Canada, CKZN St John's	6160do			
2200-2300	Canada, CKZU Vancouver	6160do			
2200-2230 as	Canada, R Canada Intl	5960am	9755am	11705as	13670am
		13740am	15305am		
2200-2300	China, China Radio Intl	9880eu			
2200-2300	Costa Rica, RF Peace Intl	7385am	15050am		
2200-2300 vl	Cyprus, BRT International	6150do			
2200-2245	Egypt, Radio Cairo	9900eu			
2200-2300	Eqt Guinea, Radio Africa	15186af			
2200-2215	Ghana, Ghana Broadc Corp	4915do			
2200-2230	Hungary, Radio Budapest	3975eu	7250eu	9835eu	
2200-2230	India, All India Radio	7150eu	7410eu	9910eu	9950eu
		11620au	11715au		
2200-2225	Italy, RAI Intl	6150as	9665as	11815pa	
2200-2300	Lebanon, Voice of Hope	9960do			
2200-2215	Liberia, LCN/R Liberia Int	5100do			
2200-2300	Malaysia, Radio	7295do			
2200-2255	Moldova, R Moldova Intl	7520eu			
2200-2300 smtwhf	New Zealand, R NZ Intl	11735pa			
2200-2215	Nigeria, FRCN/Radio	3326do	4770do	4990do	
2200-2230 s	Norway, Radio Norway Intl	7570sa			
2200-2300 vl	Papua New Guinea, NBC	9675do			
2200-2300	Russia, Voice of Russia WS	7250eu	7360eu	7370eu	7440eu
		9620eu	9655eu	9665eu	9710eu
		9740eu	9765eu	9775eu	9880eu
		11840eu			
2200-2230	Serbia, R Yugoslavia	6100eu	6185eu		
2200-2215	Sierra Leone, SLBS	3316do			
2200-2300 vl	Solomon Islands, SIBC	5020do			
2200-2300	Taiwan, VO Free China	15600eu	17750eu		
2200-2300	Ukraine, R Ukraine Intl	5905eu	6010eu	6020eu	6090eu
		7170eu	7240eu	7380au	9550na
		9560na	9640na	12040na	13590na
		13720sa			
2200-2300	United Kingdom, BBC WS	5965as	5975am	6175am	6180eu
		6195as	7325va	9410va	9590am
		9660as	9890as	9915am	11750am
		11835af	11955as	12080as	15400af
2200-2230	United Kingdom, BBC WS	12095eu			
2200-2300	United Kingdom, UCB	6200eu			
2200-2300	USA, KAIJ Dallas TX	13815am			
2200-2300	USA, KTBN Salt Lk City UT	15590am			
2200-2300	USA, KWHR Naalehu HI	17555pa			
2200-2300	USA, Monitor Radio Intl	7510eu	13770sa		
2200-2300	USA, Voice of America	7215as	9705as	9770as	11760as
		15185as	15290as	15305as	17735as
		17820as			
2200-2230 mtwhf	USA, Voice of America	6035af	7340af	7375af	7415af
		11975af			
2200-2300	USA, WEWN Birmingham AL	5825am	13615na	15745eu	
2200-2300	USA, WGTG McCaysville GA	9400am			
2200-2300	USA, WHRI Noblesville IN	9495am	9495am		
2200-2300	USA, WJCR Upton KY	7490na			
2200-2300	USA, WRMI/R Miami Intl	9955am			
2200-2300	USA, WRNO New Orleans LA	7355am	15420am		
2200-2300	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
2200-2300 vl	USA, WYFR Okeechobee FL	17845eu	21525eu		
2203-2208	Zambia, R Zambia/ZNBC 1	4910do			
2230-2208	Croatia, Croatian Radio	5895eu	7165eu	11635na	
2230-2300	Canada, R Canada Intl	5960na	9755na		
2230-2300 mtwhf	Canada, R Canada Intl	13670na			
2230-2300 as	Canada, R Canada Intl	6040na	9535na	11940na	
2230-2300	Cuba, Radio Havana	6000na	6180na		
2230-2227	Czech Rep, Radio Prague	7345na	11600na		
2230-2300	Russia, Voice of Russia WS	5940eu			
2240-2250	Greece, Voice of	7480au	9425au		
2245-2300	Ghana, Ghana Broadc Corp	3366do	4915do		
2245-2300	India, All India Radio	9705as	9950as	11620as	
2245-2300	Vatican State, Vatican R	7305au	9600au	11830au	

PROPAGATION CONDITIONS, UNITED STATES

LET'S TALK THE SAME LANGUAGE! PART 3

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Well, we have at last reached the final installment of the glossary. I have to admit that I did reduce the size of the glossary by removing some terms that really are not used that often. I promise that if I ever use a term that is not in this glossary, I will explain it in my article.

Solar Cycle

Solar activity changes over a period of, on average, 11 years. At solar maximum, the solar activity is high and so, too, the EUV radiation output which affects the ionosphere. At solar minimum, the opposite is true.

Solar Wind

The outflow of solar material from the hot, unstable corona. The solar wind blows into interplanetary space with a speed of about 400 km/s (this can vary dramatically), carrying with it the magnetic fields that originate in the sun.

Sporadic E

A thin ionized layer in the E region that occurs irregularly.

Spread F

Irregularities in the F region of the ionosphere which scatter radio signals causing a degradation in communications.

Storm

Severe departure from normal conditions in either the ionosphere or the Earth's magnetic field.

Sudden Commencement

A sudden impulse becomes a sudden commencement if the impulse is succeeded by a geomagnetic storm. In most cases, sudden commencements occur almost simultaneously around the world.

Sunspots

Relatively cool regions in the solar photosphere that appear dark. They contain intense magnetic fields which provide the energy for solar flares. Sunspots occur in groups.

Sunspot Number

An index of solar activity related to the number of sunspots and sunspot groups present on the sun.

BIBLIOGRAPHY

There are some excellent books available on the subject of radio propagation and propagation forecasting. Anyone interested in pursuing the study of this subject should consult any of these. I have indicated the rating as (Expert), (Advanced) or (Beginner).

The following books can normally be borrowed from your library or via an inter-library loan.

Goodman, J. M. *HF Communications, Science & Technology*. Van Nostrand Reinhold, 1992. (This book contains a very elaborate and comprehensive bibliography on the subject of HF radio propagation.) (Expert)

Jacobs, G. W3ASK, T. J. Cohen, N4XX and Robert B. Rose, K6GKU. *The New Shortwave Propagation Handbook*. CQ Publishing, Inc.

OPTIMUM WORKING FREQUENCIES (MHz) For the Period 15 November to 14 December 1997 Flux=95 SSN=40

UTC	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
TO/FROM US WEST COAST																								
SOUTH AMERICA	22	16	13	11	11	11	11	11	11	10	9	10	9	10	16	23	25	25	25	25	25	25	25	24
WESTERN EUROPE	8	8	8	8	8	8	8	8	8	8	8	8	8	9	10	15	19	19	17	14	11	10	9	8
EASTERN EUROPE (P)	7	8	7	7	7	8	9	9	9	9	9	9	9	9	10	12	11	9	*	*	*	*	*	*
MEDITERRANEAN	12	12	12	11	9	10	10	10	10	*	*	*	*	*	12	15	20	17	14	13	12	12	12	12
MIDDLE EAST (P)	11	11	11	11	10	*	*	*	*	*	*	*	*	9	9	9	11	12	11	10	*	*	*	10
CENTRAL AFRICA	17	15	12	11	10	10	10	*	*	*	*	*	*	15	22	24	24	21	19	20	21	22	19	
SOUTH AFRICA	16	15	12	11	11	11	11	*	*	*	*	*	*	17	23	24	24	23	21	19	18	17	17	
SOUTH EAST ASIA (P)	21	22	18	14	*	*	*	*	*	*	10	10	10	10	10	10	13	12	12	11	*	*	*	11
FAR EAST	23	21	18	13	10	9	9	9	9	9	9	9	9	9	9	9	9	9	9	10	14	20	23	
AUSTRALIA	21	22	21	15	*	*	*	11	11	11	11	11	10	9	9	10	16	15	14	16	18	18	19	20
TO/FROM US MIDWEST																								
SOUTH AMERICA	17	12	11	10	10	10	11	11	10	9	8	9	9	13	19	23	23	23	23	23	23	23	22	20
WESTERN EUROPE	9	9	9	9	9	9	9	9	9	10	10	9	10	13	16	20	20	22	20	18	14	10	9	10
EASTERN EUROPE	7	7	7	7	7	8	9	9	9	9	9	9	9	10	14	15	13	10	*	*	*	*	*	7
MEDITERRANEAN	12	12	12	11	10	10	10	10	*	*	*	*	*	13	18	22	23	19	15	14	13	12	12	12
MIDDLE EAST (P)	11	11	10	10	9	9	*	*	*	*	*	*	9	10	13	14	12	11	*	*	*	11	11	11
CENTRAL AFRICA	16	13	11	10	10	10	10	*	*	*	*	*	16	22	24	24	24	22	20	20	22	22	19	
SOUTH AFRICA	15	13	11	11	11	11	11	*	*	*	*	*	17	23	24	24	24	23	21	19	18	17	17	
SOUTH EAST ASIA (P)	19	17	14	*	*	*	*	*	*	*	9	9	9	9	10	13	12	12	11	*	*	*	*	10
FAR EAST	22	19	14	11	10	9	9	9	9	9	9	9	9	9	10	10	10	10	10	10	14	21	24	
AUSTRALIA	21	21	15	*	*	*	11	11	11	11	10	10	10	10	11	17	16	15	14	16	18	18	19	20
TO/FROM US EAST COAST																								
SOUTH AMERICA	11	10	10	10	10	10	10	10	9	8	8	9	14	19	21	21	20	20	20	20	19	18	14	
WESTERN EUROPE	8	8	8	8	8	8	8	8	9	9	8	10	14	19	21	21	21	20	18	16	12	10	9	9
EASTERN EUROPE	8	8	8	7	8	8	8	8	8	8	8	9	12	17	19	16	13	11	*	*	*	8	8	8
MEDITERRANEAN	12	10	9	9	9	9	9	9	9	*	*	11	16	21	22	23	22	19	16	14	13	13	12	
MIDDLE EAST (P)	11	11	10	10	10	10	*	*	*	*	*	14	19	19	15	13	12	11	11	11	11	11	11	
CENTRAL AFRICA	13	12	12	12	12	11	12	11	*	*	*	15	19	23	23	25	25	25	23	20	20	22	18	15
SOUTH AFRICA	13	12	12	12	11	12	12	*	*	*	*	15	21	24	24	24	24	24	23	21	20	18	18	15
SOUTH EAST ASIA (P)	14	12	*	*	*	*	*	*	*	*	10	10	11	13	15	14	12	11	11	11	10	10	9	10
FAR EAST	17	13	12	*	*	10	10	10	10	10	10	10	10	10	10	10	10	*	*	*	11	13	19	19
AUSTRALIA	19	*	*	*	*	*	11	11	11	11	10	10	13	18	17	16	15	14	16	17	18	19	20	

*Unfavorable conditions: Search around the last listed frequency for activity.

1995. (Excellent primer on the subject of propagation.) (Beginner)

McNamara, Leo F. *The Ionosphere: Communications, Surveillance, and Direction Finding*. Krieger Publishing Company, 1991. (Expert)

McNamara, Leo F. *Radio Amateurs Guide to the Ionosphere*. Krieger Publishing Company, 1994. (This book from McNamara contains the first ten chapters from his previous book (see above), and some interesting new material for the SWL and Ham operator.) (Advanced)

GET READY FOR WINTER DX'ing

With winter coming for most of our readers, now is the time to ensure that your antenna and

all the supporting hardware is in good condition and ready for the cold winds and the snow. Do not wait till everything is hanging down to inspect this vital piece of equipment and make any repairs necessary.

The radio amateur fraternity has coined the expression "antenna weather" and while we are in the glossary mode I should define it. "Antenna weather" is the weather that will occur on the coldest and snowiest day of the winter when it is absolutely necessary to work on the antennas because no preventative maintenance has been done early enough. Do not get caught: check your antenna before that day comes to an area near you!

Winter is coming and the static crashes will slowly subside, so keep your chin up, the good SWL season is coming. Good DX!

Undoing a Few Myths

One of the most humbling experiences in my life was going through the process of writing my book *Radio Monitoring: A How-To Guide*.¹ It was a classic case of thinking one knows a lot and discovering how much one doesn't know. In the course of doing the research, I came to discover that more than a few things I thought I really knew turned out to be just myth, fiction, or even plain old foolishness.

Radio has been around for about one hundred years. In that time, more than a bit of legend has been misinterpreted as lore. As ideas are passed from one hobbyist to another, with the best of intentions, a few inaccuracies may have been passed along as fact in spite of the problems associated with them. Even Old Uncle Skip has fallen victim to such ideas. I have even perpetrated a few along the way.

However, life is a learning experience. We can learn the proper information and then go about getting it into the hands of folks so it can be put to good use. So to this end, let's take a look at some radio myths both big and small, historic and practical, and get a few facts on the table. Of course these facts will be well laced with Old Uncle Skip's opinions, but that is half the fun I have in writing this column.

■ MYTH #1

Marconi Invented Radio

Ah, semantics. To begin with, it might be more proper to say that Marconi *discovered* radio. The ability of electromagnetic waves to propagate through space has existed since the beginning of the universe. Guglielmo Marconi just figured out a way to put this discovery to good use.

Actually, he wasn't even the first to notice this process. The first experiments in this area were conducted (no pun intended) by Michael Faraday and Joseph Henry in the early 1800's. Christian Oersted figured out electromagnetic induction. Heinrich Hertz demonstrated the existence of electromagnetic waves, and Edouard Branly developed the rudimentary receiver of electromagnetic waves. All of these folks did their business over the ninety years prior to Marconi getting his first patent.

Don't forget that around the same time Marconi was doing his thing, Dr. Mahlon Loomis, William H. Preece, and Nathan Stubblefield were also developing radio systems. Stubblefield's patent predates Marconi's

by eight years. You can see how confusing this thing can get.

But let's go back to this invention vs. discovery thing. Each of these folks invented a few devices that allowed them to take advantage of their discoveries about electromagnetic waves. Interestingly, none of their devices have much impact on what we consider radio transmitting and receiving today. Nobody uses "spark gaps" for transmission or "coherers" for receiving these days. On the other hand, much of modern radio can be attributed to one gentleman in particular: Edwin Armstrong.

Armstrong developed the superheterodyne receiver: His circuits are the basis for probably every AM radio in your collection and mine. He also developed the system that became the basis for FM transmission. Lots of people had a hand in discovering radio and making it useful, but none had the overall impact that Armstrong did.

So the proper answer would be that *nobody* invented radio. Radio was always there, but in Uncle Skip's humble opinion, we owe what we have today as our hobby to Edwin Armstrong.



■ MYTH #2

Rock Salt Improves Ground Conductivity on Earth Grounding Systems

Well, actually it does improve ground conductivity. The problem, and the myth, comes in when you pour a load of rock salt around a copper ground rod! It will improve the ground conductivity, but it will also corrode the daylight out of the ground rod—thereby nullifying any positive effects it may have had.

Like a good little radio person I dutifully dumped rock salt around my ground for years, just as several texts from which I learned had taught me. Heck, if you go back many years in your *MT* collection you'll even find me perpetuating this practice. It was Bill Cheek that helped Old Uncle Skip see the light on this issue.

Bill went further and taught me that a

better way to improve the ground conductivity is to use a clay compound called Bentonite. This stuff is available at chemical supply stores, usually in 100 lb. bags. He also taught me that, if you're using hollow copper water pipe for the ground stake, you can further improve the situation by drilling eighth inch holes every six inches or so down the pipe's length before installing it in your Bentonite filled hole. Then you can periodically pour a solution of water and copper sulfate down the pipe to further good ground characteristics. I've ascribed to Bill's technique ever since and have had great success with it.

On a related point about grounds: I recently had to set up a new ground system at my house. Prior to delving into this project I was reading through the *ARRL Handbook*². There I learned that most electrical codes recommend tying *all* grounds in the household electrical system together at a common point where they go to the ground stake or cold water pipe ground. This would include your house electrical system ground, cable TV, and any household TV and radio antennas. This serves to further reduce shock hazard when using electrical equipment.

You see, a radio receiver could have two grounds attached to it—one that goes to the three-pronged house outlet and one related to the antenna. In the event of a short, if the grounds are not properly tied together, it is possible that the house and/or receiver's circuit breakers would not trip as they should, causing a serious shock hazard.

Always check your local electrical codes to make sure whatever you do is in compliance. Failure to follow code can result in invalidating your house insurance, not to mention possibly causing your nose to light up.

■ MYTH #3

You Need to Use Expensive Coax for Receiving Antennas

The master himself woke me up to this point. Bob Grove has often taught that the more expensive RG-58 and RG-8 coaxial cables do not need to be used on antenna systems that are being used for receiving only.

Radio monitors can get by just fine with generally less expensive RG-6 CATV cable. RG-6 is light, flexible, and has 100% shield-

ing—something that only appears in other cables costing a great deal more per foot.

Don't get caught up too much in the characteristic impedance of the line (RG-6 is 75 ohms while "radio" cables such as RG-8 and RG-58 are 50 ohms). While these factors are of some concern if you're hooking things up to a transmitter, you can sleep easy if you're just planning to listen.

■ MYTH #4

You Need Coaxial Cable to Transmit

How about using something even more inexpensive than RG-6 for transmitting? I've used an antenna fed with common 300 ohm TV twinlead for years. Remember, folks, radio has been around for about one hundred years but coax has only been around for about fifty as far as hobbyists are concerned (the government kept the good stuff to itself throughout World War II).

How do you think folks fed their transmitting antennas before the days of coax? The most common non-coax feed then and now is a "balanced line" feed.

Okay, you smart folks out there are already wondering how I can keep a fifty ohm transmitter output happy with the 300 ohm antenna feed that twinlead presents. It's simple, really. All you need is an antenna tuner that is designed for balanced lines. I've used the MFJ-941C for years with this setup, but other brands and models are available as well.

The easiest all-band ham antenna you can construct is an eighty meter dipole fed with 300 ohm twinlead into a balance line tuner. It works everywhere on all the ham bands without a peep (keep the power under 250 watts unless you're going to use heavy duty feedline) and I've worked the world a few times over with this inexpensive and practical antenna system.

(MYTH #4-1/2, You Need Expensive Antennas to Be Successful in Amateur Radio) Also with this system you don't have to pay any real attention to the antennas SWR (Standing Wave Ratio). As long as it loads and the transmitter "sees" 50 ohms it will work just fine. Speaking of SWR...

■ MYTH #5

You Absolutely Must Have a 1:1 SWR Ratio to Transmit.

This bit of hogwash came along in the height of the CB craze of the seventies. Sure, a 1:1 SWR is ideal, but it almost never happens in real life. I know dozens of folks who committed literally hours to getting what they thought was a 1:1 match on their mobile CB whip. I never had the heart to tell them that

their "hand capacitance" was probably throwing the setting off. Furthermore, every time a big truck pulled up beside them the ratio would also be affected. Why bother them with the facts when they were so happy with their accomplishments?

The fact is, commercial standards indicate that anything better than a 2:1 SWR is usually just fine. In practice you can even stretch that to 2.5:1 before modern equipment starts to complain. Now, remember that we are talking here about transmitting antennas fed with coaxial cable. That balanced line dipole I talked about earlier could present SWR ratios that would go off scale—they just didn't matter as long as the tuner allowed the rig to see 50 ohms. So take it from Old Uncle Skip. The time spent trying to get down to a 1:1 SWR could be better spent working the world at a 2:1 SWR ratio.

■ MYTH #6

It's Hard to Get Your Amateur Radio License

If anything, it's never been easier. So many great tools exist now to help you through the licensing process that a person of average intelligence should be able to get their "No-Code" Technician's class license with just a few weeks of studying any of the better prepared study guides. Modern Morse code training software makes it possible for even the most code-fearing individual to move up to a Tech-Plus license with about a month of short fifteen or so minute study sessions. All the higher licenses are equally accessible thanks to the great learning tools produced by organizations such as The American Radio Relay League and others.

The sun spot cycle is coming around, folks. Now is the time to hit the books and get ready for all that great DX that's starting to reappear. Look for me on 40 meter CW.

■ MYTH #7

Uncle Skip Will Run Out of Ideas for this Column

Not a chance, Bunkey! I'm always learning new things or new ways to do old things. You loyal readers keep my email box full of great suggestions and thought provoking discussions. I'm still as excited about the radio hobby as I was when I was just a wee tyke in a vacuum tube world. The radio hobby is the greatest fun there is, and that's no myth!

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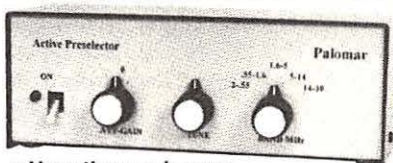


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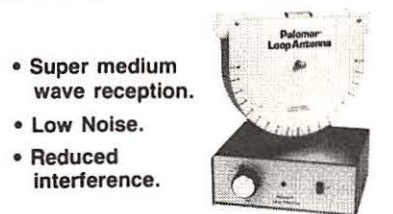
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Reader News & Updates

The DXing season is now well underway. Long gone are the static crashes which kept so many away from the dials during the warmer months. Although conditions are just now improving, letters and e-mail have been streaming in right along, so let's open the mailbag and see what's happening in the world below 500 kHz.

Patrick Crandall (AZ) is active on the low bands with a 1940's vintage GD10 Canadian Airforce receiver which tunes from 190 to 510 kHz. Although it is a very capable receiver for beacons, it doesn't tune quite low enough for Patrick's newest interest—Natural Radio. For these "lowest-of-the-low" bands, he's been considering a homebrew design.

For Patrick, and others interested building such a receiver, I'd like to recommend Stephen P. McGreevy's BBB-4 design. It can be built in one evening from Radio Shack parts, and is very inexpensive. You'll find complete plans for the receiver on Stephen's web site at <http://www.triax.com/vlfradio/bbb4rx3.htm>. Not active on the Net? Drop me a note with an SASE and I'll send you a copy of the plans. Refer to the December '96 and January '97 columns for more information on Natural Radio.

This is an excellent time to explore natural radio, as one of the major interference sources—Omega navigation (10-14 kHz)—is now gone. It was shut down by the Coast Guard on September 30th.

Gary Timm (WI) is a new longwave DXer who became interested in the band during the Longwave DX Award (LDXA) contest we ran this past summer. He amassed an impressive score using nothing more than a Grundig Satellit 700 (which tunes only to 353 kHz), and the receiver's built-in ferrite rod antenna. His list of loggings are presented in Table 1.

Gary enjoyed seeing the miles-per-watt scores of the entries and would like to see this information included with loggings on a regular basis. I agree, and will be happy to include this information whenever it is supplied to me by readers. It provides more meaningful data when reviewing log entries. Miles-per-watt can be easily determined by dividing the wattage of the beacon (listed in the *Aero-Marine Beacon Guide*) by the airline distance to your receiving post. (Example: 400 miles ÷ 25

watts = 16 miles per watt.). I will consider this optional information for future logs submitted to the column.

Gary also enclosed a nice photo of BL (260 kHz) in Milwaukee, WI (see Figure 1). He asks about the V-shaped 75 MHz marker antenna at many beacon sites and wonders why they consist of two main elements. This type of array produces a distinctive radiation pattern that confines the signal to an upward, narrow beam, allowing pilots to accurately determine when they pass over the beacon site.

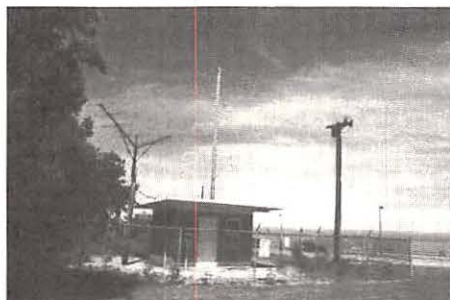


FIGURE 1. View of "BL" (260 kHz), Milwaukee, WI (Note the 75 MHz V-shaped antenna at left) Photo by Gary Timm (WI).

TABLE 1. SELECTED BEACON LOGGINGS

Submitted by Gary Timm (WI)

Freq.	ID	Location	Miles per Watt
219	YMG†	Manitouwadge, Ont.	4.4
250	YTJ†	Terrence Bay, Ont.	4.0
332	HK*	Chicago, IL	3.8
334	YER†	Ft. Severn, Ont.	9.0
335	RWN*	Winamac, IN	6.0
341	LDM*	Ludington, MI	4.0
341	YYU*	Kapuskasing, Ont.	20.8
348	M†	Montreal, Que.	7.4
353	FOA*	Flora, IL	12.0
353	QG*	Windsor, Ont.	10.4

* 25 watt beacon

† 100 watt beacon

■ Listen for Iceland

Today, it seems like we're hearing about more longwave shut downs rather than startups, but there is an exception worthy of note. The September issue of *DX Ontario*, the journal of the Ontario DX Association, re-

ports a new broadcast station from Iceland on 189 kHz. (A possible parallel station may also be active on 207 kHz). Stay tuned to these frequencies during the coming months for some new activity. This would be an excellent target for listeners in the northeastern U.S.

Speaking of new signals, we reported a while back that WWVB would be increasing its power output fourfold and improving its antenna system this fall. Things are progressing well at the station, but the projected date for completion has now been pushed into December.

These changes are being made to improve WWVB's signal as received by automated clocks, instrumentation, and even some high-end wrist watches. Radio Shack is already carrying a clock that tracks to WWVB. The ad literature claims it uses WWV, but I've been assured that 60 kHz WWVB is the actual time source for this product. The clock sports a loop antenna that can be oriented for best reception of the time signal.

■ When writing...

Anyone who's followed *Below 500 kHz* for long knows that I love to get reader mail. It is the life-blood of this column, so please keep it up! I do want to remind readers to always use the *Monitoring Times* address when writing. This lets the folks in Brasstown know that the interest in longwave runs high among the readership. E-mail at the address shown in the masthead is also welcome.

Sometimes I receive loggings and reader letters at my personal P.O. Box. I assume readers get this information from the *Radio Amateur Callbook*, or by looking up my ham call sign on one of the many Internet services. If it's column-related mail, please send it to me, c/o *Monitoring Times*, P.O. Box 98, Brasstown, NC 28902. I hope to hear from you soon!

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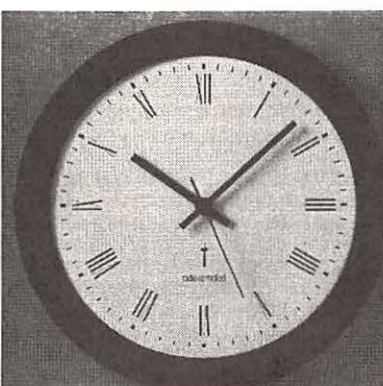
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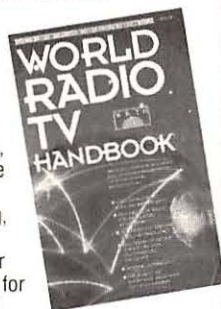
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A Listener's Bookshelf

The holidays are rapidly approaching, and it's time to start dreaming, and dropping hints... Many of us would love to see a nice new R8 or JST345 under our trees, while others would happily settle for a verification from Hawaii, or even Wyoming. Either way, most of us will be disappointed..

However, books are always a good — and realistic — stocking stuffer. This month, I'm going to suggest a few titles that might make your DXing experience more enjoyable.

Every AM DXer needs a copy of the National Radio Club's *AM Radio Log*. Quite simply, it's by far the best way to know what it is you're listening to! The *Log* starts with technical parameters like frequency, call letters, power, etc., then adds information on programming, networks, and hours of operation. Finally, for those who collect QSLs, the address and phone number of each station is listed.

The *Log* is \$22.95 in the U.S. and Canada (less if you're a NRC member); send your checks to NRC Publications, Box 164, Mannsville NY 13661. If you already have this year's *Log*, consider sending a stamp to NRC Publications anyway, and asking for the *NRC Publications Catalog*. The club prints quite a few other books of very specific interest to the AM DXer. (One of the more interesting is the newly updated *Nighttime Antenna Pattern Book*, which shows the directional antenna patterns of all U.S. and Canadian AM stations that broadcast at night.)

If your tastes are more for FM, you want the *FM Atlas* by Bruce Elving: \$14.95 from Grove Enterprises. A new edition appeared this year, and with the dozens of new stations appearing (and changes to existing stations) you need the latest edition.

Several DXers have recommended the *M Street Radio Directory* (also available from Grove). This book is designed for the radio professional, but the rating, address, and programming information included is quite valuable for the DXer. And the *M Street* book (at \$48.95) is still much more reasonably priced than traditional trade publications like the *Broadcasting and Cable Yearbook*.

Many radio enthusiasts are also nostalgia buffs. The *Grove Buyers Guide* bound into your September *MT* lists a variety of nostalgia books of specific interest to the domestic-



And if you also DX FM, a copy of the 17th Edition FM Atlas (shown to the right) needs to be on your bookshelf.

The NRC's AM Radio Log (shown to the left) is the standard AM DXer reference. Unfortunately, the station logos only appear on the cover, HI!



A guide for travelers, hi-fi listeners, media people and hobbyists

band listener. Subjects include Philco's pre-WW2 receivers, the early days of the transistor portable, and the ever-popular Zenith Transoceanic.

Crystal Sets by Philip N. Anderson goes a step beyond reviewing nostalgic receivers; it shows how to build your own crystal radio. If you're interested in building your own receiver but aren't too confident of your electronic abilities, this is a good place to start.

I know many AM DXers are also serious about shortwave, or ham radio; if you're one of them, you probably already familiar with some of these next books. If you only DX the domestic bands, you need to become familiar with them.

The *ARRL Handbook for Radio Amateurs* is somewhat misleadingly named. Professionals have been buying this book for years; it's full of reference information and circuits of value for all radio frequencies (including VHF/UHF/microwave; scanner and satellite buffs should also consider this one). At \$38, it may seem a bit steep, but you're getting 1200 pages of invaluable information.

If you're not quite ready to spend \$38, Grove offers several other shortwave books of interest to the AM DXer. *Scanner and*

Shortwave Answer Book, *Receiving Antenna Handbook*, *The ARRL Antenna Book* (another standard reference often used by professionals), and *The Antenna Factbook* all provide information targeted to SWLs, but also useful on AM. *Radio Monitoring* is an all-spectrum beginner's book by MT's own Skip Arey.

The classic *Shortwave Listening Guidebook* by Harry Helms is now out of stock at Grove, but is still available elsewhere. If you're thinking of buying a new shortwave receiver, check out the *RDI White Papers*. Lawrence Magne's reports will tell you everything you could ever want to know about the various top-end SW/AM receivers.

■ Bits and Pieces

- It happened in mid-August. A top national newsmagazine printed a transcript of a cellular-phone conversation between two top government officials. The contents of the transcript enraged many citizens — but the government's only regret was that the conversation was recorded and printed.
- The CBC in Canada has dropped yet another bombshell. No, they aren't taking any more 50,000 watt AM stations off the air (at least not yet!). But they are changing the

names of their two radio networks.

The network formerly known as CBC Radio is now known as CBC Radio One; most of Radio One's larger transmitters are AM, though as you read over the last two months, some are being converted to FM. While the press release doesn't specifically say so, it strongly implies the monophonic FM transmitters used by Radio One will be converted to stereo. The network will continue to air mostly news and information.

CBC Stereo has always operated on FM stereo frequencies, with programming heavy in classical music. This network will become known as CBC Radio Two. Radio Two will add more cultural programming beyond classical music, including spoken-word information on the arts in Canada.

• Back in the 1920s and early 1930s, the Federal Radio Commission (predecessor to the FCC) would authorize portable stations. These stations could set up in different parts of the country to broadcast from various events. The portable station disappeared in the U.S. many years ago — but now it's reappeared in Canada. The Canadian government has authorized a new station to broadcast play-by-play commentary on 30-40 hours a week of amateur sporting events at various

locations in the Toronto area. This should be a truly interesting catch; listen on 1610 kHz.

• Brian Begg of northern New Jersey is hearing a new travelers-information station, or TIS, on 530 kHz. The station operates 24 hours a day from Rutgers University in New Brunswick, carrying a wide variety of safety, convenience, and other information for the University's students. From its location in one of the most densely-populated areas of the country, many DXers should be able to log this station.

Brian asks, "Have you received any other reports of low-power AM stations in your

email? These would be a real challenge for the AM-BCB DXer." Yes, I do receive reports of these stations from time to time. I'm writing this in early September, so the AM band is still pretty noisy and there haven't been many reports of *anything* lately! But I personally have heard TISes from Virginia, Illinois, and Texas in my Nashville-area location.

I'd definitely like to hear from any of you who've logged these flea-power operations; they make interesting, and exotic, catches for all DXers. Write me at Box 98, Brasstown NC 28902-0098, or by email at 72777.3143@compuserve.com.

CALL CHANGES

The following AM stations have changed callsigns in the last month:

Old call:	City:	New call:
KIIS-1150	Los Angeles, CA	KXTA
KOFY-1050	San Mateo, CA	KTCT
WYFX-1040	Fort Pierce, FL	WIRA
WMLZ-1000	Jupiter, FL	WJBW
WKRP-1460	North Vernon, IN	WNVI
KQAM-1410	Wichita, KS	KMYR
WINH-1380	Winchester, KY	WMJR
WCSY-940	South Haven, MI	WGMV
KFTW-1450	Fredericktown, MO	KYLS
KMPL-1520	Sikeston, MO	KRHW
WLLE-570	Raleigh, NC	WRDT
WIST-550	Statesville, NC	WTLI
KFJM-1370	Grand Forks, ND	KUND
WQBK-1300	Rensselaer, NY	WTMM
WCMF-990	Rochester, NY	WDCZ
WELL-1380	Lorain, OH	WDLW
KRSR-1420	Coos Bay, OR	KMHS
KOTK-620	Portland, OR	KEWS
KZTW-860	Troutdale, OR	KPAM
WRAH-1360	Easley, SC	WELP
KAWS-1240	Hemphill, TX	KPBL
WZHF-1390	Arlington, VA	WDBI
WTAR-790	Norfolk, VA	WNIS
WNIS-850	Norfolk, VA	WTAR

The two California changes reflect the conversion of both stations to an all-sports format. And the two Norfolk, Virginia, changes indicate WTAR and WNIS have swapped frequencies. Call letters have also been assigned for new stations in Rupert, Idaho (KETO), and Seward, Alaska (KFSH), but I can't find the frequencies for these stations!

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Radio Metallica Moves to Ship

Radio Metallica Worldwide, which disappeared for a month during most of August and early September, has returned with its powerful 10,600 watt pirate signal. Astonishingly, the station now operates from a ship located off the east coast of North America. Many pirates have claimed to do this over the years, but the offshore announcements are typically given with tongue firmly in cheek. In Metallica's case, the maritime transmitter is genuine.

Many DXers have noticed that since the station's late summer return to the air, Metallica's powerful AM transmitter has drifted slightly in frequency during broadcasts. Dr. Tornado, in an interview with *Monitoring Times*, said that this has been caused by the performance of the ship's generator, which produces slightly variable voltages.

Alan Weiner, who operated **Radio New York Worldwide** from a ship off Long Island until busted by the FCC in 1987, reportedly is outfitting yet another ship in Boston Harbor for shortwave broadcasting near an undisclosed Caribbean country. Few thought that Radio Metallica Worldwide would beat Weiner to the punch in 1997, but this has happened.

■ Kennard Named FCC Chair

USA President Bill Clinton has nominated William E. Kennard as the new chairman of the Federal Communications Commission. Kennard, previously general counsel at the FCC, will replace Reed Hundt in the position. Clinton has also nominated Michael Powell to a seat on the Commission. Powell, son of General Colin Powell, is currently chief of staff at the US Department of Justice Antitrust Division. Personnel moves at the FCC are always of interest to unlicensed pirate broadcasters, none of which are authorized by the FCC.

■ Voice of Tibet

Rich D'Angelo of Wyomissing, Pennsylvania, best known as the Executive Director of the North American Shortwave Association, logged the clandestine **Voice of Tibet** on 11570 kHz from 1228 to 1255 UTC on September 14. An interval signal and identification loop tape aired at 1222 UTC. Rich noted a good signal at tune-in, which deteriorated as he listened. Now that winter conditions are returning, Asian

THIS CONFIRMS THAT George Zeller HEARD OUR BROADCAST ON
DATE 12/22/96 TIME 2350 DJ "Capt. No Beard" FREQ. 6.9550 Khz

Long awaited WARR veries are arriving

clandestines will be a better bet for North American DXers. Thanks go to Numero Uno #1441 for Rich's catch.

■ ACE Address Correction

Some of our sharp-eyed readers noticed that the address for the Association of Clandestine radio Enthusiasts was mangled in the list of shortwave radio clubs printed in the September issue of *Monitoring Times*. Club President Pat Murphy advises that the correct address remains ACE, PO Box 12112, Norfolk, VA 23541. More information on North America's largest club devoted to unlicensed pirate and clandestine broadcast DXing is available at the ACE internet web site, with a <http://www.frn.net/ace/> URL.

■ What We Are Hearing

Your pirate loggings are always welcome via PO Box 98, Brasstown, NC 28902, or via the e-mail address at the top of the column. All frequencies are in kHz, with times in UTC.

North American pirate stations listed here use the following addresses: PO Box 1, Belfast, NY 14711; PO Box 109, Blue Ridge Summit, PA 17214; PO Box 28413, Providence, RI 02908; PO Box 146, Stoneham, MA 02180; PO Box 11522, Huntsville, Alabama 35814, and

PO Box 293, Merlin, Ontario N0P 1W0. For return postage, enclose three 32¢ stamps in the envelope to USA addresses. \$2 US or two International Reply Coupons go to foreign maildrops.

6YVOS- 6955 at 2300. This one normally emphasizes Jamaican reggae and drug advocacy, but some programs this year have aired Grateful Dead music. Addr: Belfast. (Michael Prindle, New Suffolk, NY)

Alan Masysga Project- 6955 at 0115. Alan Parsons Project rock music dominates their broadcasts. Addr: Providence. (Rich and Talea Jurens, Katy, TX; Niel Wolfish, Toronto, Ontario; Bill McClintock, Minneapolis, MN; William Hassig, Mt. Prospect, IL; Prindle)

Altered States Radio- 6955 at 0000. William Hurt normally programs rock music. Addr: Merlin. (Jurens; McClintock; Wolfish)

Argosy Magazine- 6955 at 2000. This new one features drama presentations based on Argosy Magazine stories originally published in 1938. Addr: Merlin. (George Zeller, Cleveland, OH; Wolfish)

CSIC- 6955 at 0115. Pirate Rambo, at "Canada's Worst Pirate," is famous for his actual Rubber Chicken QSL that goes to every 50th correct reception report. Addr: Blue Ridge Summit and Merlin. (Bill Wilkins, Springfield, MO; Shawn Axelrod, Winnipeg, Manitoba; Jurens; Prindle; Wolfish)

He Man Radio- 6955 at 0000. He Man's programming is self-described as "manly," always in upper sideband, "the manliest of all

modes." Addr: Blue Ridge Summit. (Ranier Brandt; Hoefler, Germany; Lee Silvi, Mentor, OH; Axelrod; Jurrens; McClintock; Prindle; Wolfish)

Indira Calling- 6955 at 2145. East Indian music is featured in their shows. Addr: Providence. (Axelrod; Jurrens; Wolfish)

Jimmy the Weasel Live- 6955 at 2230. This one barely leaves the ranks of the two-way QSO rag chewers by crossing the line into program production. Addr: None. (Silvi)

Jerry Rigged Radio- 6955 at 0215. This rock music pirate recently transmitted a show on "Pirate Radio Syndrome," a little known disease. Addr: Providence. (Ross Comeau, Andover, MA; Greg Majewski, Oakdale, CT; Silvi)

Jolly Green Radio- 6955 at 2315. Identifications and TV audio themes are heard here, but not much is known about the station. Addr: None. (John Sedlacek, Omaha, NE; Majewski)

KRAP- 6955 at 0115. Fred Flintstone's rock music is broadcast by a transmitter that is nearly as powerful as Metallica's monster, leading to very good AM reception over a wide area of North America. Addr: Blue Ridge Summit. (Chris Lealos, Bangor, ME; Joel Gosse, St. Paul, MN; Axelrod; Comeau; Hassig; Majewski; Prindle; Silvi; Wilkins)

La Voz de Mundano Tiempo- 6955 at 1730. This unusual new pirate programs Afro-Pop, Calypso, Mexican Ranchera, and new age music, with ID's in Spanish. Addr: Belfast. (Ed Rausch, Cedar Grove, NJ)

Lounge Lizard Radio- 6955 at 0315. Cocktail lounge music is hard to find on commercial radio, but this pirate has it. Addr: Providence. (Jurrens; Sedlacek; Wolfish)

Mystery Radio- 6955 at 0245. If obscure instrumental new age and synthesized musical compositions are your cup of tea, then this station is for you. Addr: Stoneham. (Hassig; Jurrens; Majewski; Sedlacek; Silvi; Wilkins)

Orbital Mind Control Satellite- 6955 at 0115. Science fiction and space themes predominate on this one. They have increased their broadcasting activity noticeably. Addr: Belfast. (Mark Fine, Remington, VA; Axelrod; Hassig; Silvi; Wilkins)

Orson Wells Radio- 6955 at 2230. Once in a while, this one comes on with a replay of old Orson Wells radio drama productions from the 1930's, such as the Count of Monte Cristo. Addr: None. (Silvi)

Radio Clandestine- 6955 at 0100. R. F. Burns, who has been around for more than two decades, holds the longevity record in North American pirate radio. His old shows are resurfacing with greater regularity, combining classic rock, slick jingles, and originally produced comedy. Addr: None. (Hassig; Majewski; Silvi)

Radio Eclipse- 6955 at 0115. Steve Mann programs rock music, parody news and ads, and a listener mailbag. This format is quite common among pirates. Addr: Providence. (Chuck Butala, Westborough, MA; Axelrod; Comeau; Jurrens; Majewski; McClintock; Sedlacek; Silvi; Wilkins)

Radio Fluffernut- 6955 at 2115. The station's announcer, known as "The Announcer," plays rock music. He's noted mainly for the creative station name. Addr: Merlin. (Wolfish)

Radio Free Euphoria- 6955 at 0100. Captain Ganja's marijuana advocacy station normally mixes drug related rock music and comedy, but he occasionally joins multiple station broadcasts with other pirates. Addr: Belfast. (Harold Frodge, Midland, MI; Axelrod; Brandt; Fine; Majewski; Sedlacek; Silvi; Wilkins)

Radio Free Information- 6955 at 1330. The first broadcast of this "information" station was a lengthy and entertaining interview with Fearless Fred of **Radio Garbanzo** about the past, present, and future of this station. Addr: None. (Lealos; Prindle; Silvi; Zeller)

Radio Free Jesus- 6955 at 0345. Max Gain is the host on this musical pirate. Addr: Huntsville. (Wolfish)

Radio Metallica Worldwide- 6956 at 0015. Dr. Tornado and Señor El Niño still program rock music, with improving production values including professionally recorded station ID's. Their frequent broadcasts and 10 kW power make this one the easiest North American pirate to hear. Addr: Blue Ridge Summit. (Axelrod; Comeau; Frodge; Hassig; Majewski; Sedlacek; Silvi; Wilkins; Wolfish)

Radio Nonsense- 6955 at 0100. Joe Mama has returned, this time with a new station ID. The comedy to rock music ratio seems to have increased this time. Addr: Belfast. (Axelrod; Majewski; Silvi; Wolfish)

Radio One- 6955 at 0100. Bobaloo's rock oldies music and slick jingles create a professionally produced program. Addr: Belfast. (David Krause, Eastlake, OH; Jurrens; Silvi; Wilkins)

Radio Tellus- 6955 at 0130. Rock music and pirate broadcasting advocacy are the norm from this one, with a trademark "Oh, Yeah" slogan uttered periodically. Addr: Providence. (Frodge; Hassig; Jurrens; Majewski; Sedlacek; Silvi)

Radio Three- 6955 at 1945. Sal Amoniac plays intentionally insipid pop tunes, apparently as a parody of the other "numbered" stations. Addr: None. QSL's logs in *The ACE*. (Wolfish)

Radio Tornado Worldwide- 6955 at 2330. As parody stations go, this one is unusual. It plays off-air recordings of Dr. Tornado from Radio Metallica, repeated in an intentionally boring fashion with "Secret Agent Man" riffs constantly in the background. Addr: None, has QSL'd logs in *The ACE*. (Axelrod; Frodge; McClintock; Silvi)

Radio USA- 6955 at 0215. Mr. Blue Sky and Joe King have been around for 14 years now. Their anniversary show started as a parody of Radio Metallica, but it evolved into their usual format of punk rock and comedy. Addr: Belfast. (Gary Neal, Sugar Land, TX; Axelrod; Brandt; Frodge; Hassig; Majewski; Silvi)

Radio Wolf International- 6955 at 1300. When WKND hosts a joint broadcast with various pirates present, it generally uses this identification. Addr: Blue Ridge Summit. (Prindle)

Southern Music Radio- 6955 at 1500. When we hear this New Zealand pirate, it's almost always via a North American relay transmitter. They play local pop music. Addr: Belfast. (Frodge; Prindle)

Take It Easy Radio- 6955 at 0145. Originally this station played Eagles music, accounting for the ID, but it has expanded its focus to other rock groups. Addr: Belfast. (Joel Gosse, mobile in Port Washington, WI; Axelrod; Butala; Comeau; Hassig; Jurrens; Majewski; McClintock; Neal; Silvi; Wilkins; Wolfish)

Voice of Shortwave Radio- 6955 at 0215. QSL's are now materializing from this eclectic music and comedy station. Addr: Blue Ridge Summit. (Sedlacek; Zeller)

WAMT- 6955 at 1330. A variant of the Alan Masyga Project, this one is a time signal station giving Coordinated Alan Masyga Time announcements. Addr: Merlin. (Prindle)

WARR- 6955 at 0130. Captain No Beard mixes rock music and marijuana promotion in his shows. QSL's have arrived with promised "nickel bags," which are a nickel in a plastic bag. Addr: Belfast. (Hassig; Prindle; Wilkins)

WART- 6955 at 0145. Pirates have used these call letters before, but the latest rock music version is probably not related to the old timers. Addr: None. (Silvi)

WEED- 6955 at 0700. Although it's not as active as it used to be, their rock music and marijuana advocacy still appear occasionally. Addr: Huntsville. (Patrick Nobel, Eugene, OR; Jurrens)

WGUT- 1630 at 0200. Expert DXer Jerry Berg received a QSL from this medium wave pirate after a wait of 14 years! It pays to be patient. Addr: gigantor@geocities.com via e-mail. (Jerry Berg, Lexington, MA)

WKND- 6955 at 1300. Veteran pirate Radio Animal is most famous for the portable "Grenade" transmitters that he builds. But, he's still an active pirate. Shows feature rock music, mailbags, and in-depth discussions of the pirate scene. Addr: Blue Ridge Summit. (Comeau; Hassig; Prindle; Silvi)

WLIS- 6955 at 0015. Jack Boggan's shortwave broadcast interval signal station is easy to spot. His latest QSL in a series of over 100 designs shows Ian MacFarland and MT's George Zeller as "George of the Jungle." Addr: Blue Ridge Summit. (Axelrod; Jurrens; Hassig; Prindle; Wilkins; Wolfish)

WLWIS- 6955 at 0415. They love WLIS on this parody/tribute station, where the interval signals are artificial. Addr: Providence. (Jurrens)

WMFQ- 6955 at 1245. Rock music and promotion of the QSL process are heard on this one. Addr: Providence. (Prindle)

WMPR- 6955 at 0015. Although this rock and reggae pirate has been around for years, it still does not maintain any contact with its listeners through correspondence. Addr: None. (Axelrod; Krause; Majewski; McClintock; Jurrens; Sedlacek)

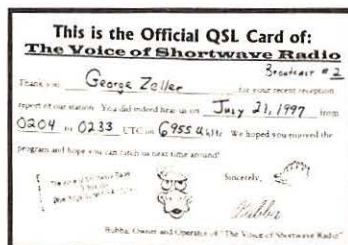
WPN, World Parody Network- 6955 at 0100. Rock music and comedy parodies are the norm from Captain Squirtlong. Addr: Huntsville. (Silvi)

WREC- 6955 at 0030. The format at P. J. Sparx's operation is an elaborate sign-on segment, novelty songs to the tune of rock music, actual rock songs, and comedy. He asks listeners to vote on their favorite bits for a forthcoming "Best of WREC" broadcast. Addr: Belfast. (Ray Carmen, Canton, OH; Axelrod; Brandt; Frodge; Hassig; Jurrens; Krause; Majewski; Prindle; Silvi; Wilkins)

WRFI- 6955 at 2045. Recent broadcasts have consisted of crank telephone call audio. Addr: alt.radio.pirate newsgroup reports solicited. (Prindle)

WRKO Shortwave- 6955 at 1400. This pirate relays shows from licensed medium wave station WRKO in Boston, especially pirate-oriented material such as their interview with Alan Weiner. Addr: Blue Ridge Summit. (Prindle)

WRYT- 6955 at 0130. Rock music and ads for an electric fence have dominated the early programming on this new pirate. Addr: None. (Axelrod; Hassig; Silvi)



Bubba delivers Voice of Shortwave Radio QSLs

What is the Best HF Antenna?

Every beginner to ham radio has asked this question, and since each of us has our particular requirements it must be understood that no one antenna is best for everyone.

Regardless of the type of antenna chosen, one thing remains paramount: the antenna must radiate efficiently. That is, it must radiate as much of the power delivered to it as possible.

Each antenna has a particular resonant frequency, and operates effectively only at or very close to this resonant frequency. Yes, even multiband antennas! As we move away from that frequency the antenna becomes reactive and radiation efficiency drops.

Efficiency can be determined by the SWR of the antenna. Normally an SWR within 2:1 is considered satisfactory (that is, the loss at 2:1 is negligible).

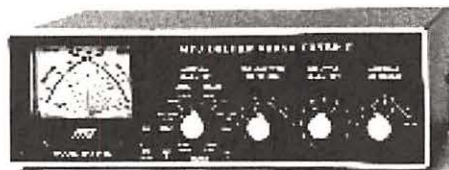
Think of the antenna as a load. If the output of our transmitter is 50 ohms and we use a 50 ohm coax to connect our transmitter to the antenna which was designed to represent 50 ohms, everything works great.

Now, getting back to that resonant frequency statement: if the antenna was cut to a frequency of, say, 7.050 MHz, it will radiate most efficiently only at this frequency. As we move above or below 7.050 radiation efficiency drops off, because the antenna is no longer resonant. Our particular antenna may show an SWR of 1:1 at 7.050 MHz, but a 2:1 SWR at 7.030 and 7.070. Therefore, we say our antenna has a bandwidth of 40 kHz (7.070 minus 7.030 equals .040 MHz, or 40 kHz). When we get beyond these frequencies, efficiency begins to drop rapidly.

The culprit at work here is called reactance. We will not go into a great discussion of reactance; it is sufficient to understand that there are two types of reactance, capacitive and inductive. When the capacitive and inductive reactance equal zero, the antenna looks like pure resistance and is most efficient or resonant.

We can alter the reactance of an antenna

Considering the benefits of a transmatch, it's a wonder every ham doesn't have one in his station (pictured - MFJ 949EY)



by introducing reactance of the opposite type into the circuit. That is, if our antenna has inductive reactance we can introduce an equal amount of capacitive reactance and the circuit will again be resonant! And, of course, we can do the same thing if our circuit is capacitive reactive by introducing equal amounts of inductive reactance.

As you might suspect at this point, inductive reactance is associated with inductors or coils, and capacitive reactance is associated with capacitors. So, if we have a device that allows us to vary the capacity and inductance of a circuit, we should be able to make any conductor resonant!

■ Making any antenna look good

We do have such a device: it is called a transmatch (also known as a tuner). With a transmatch it is possible to operate an antenna over a very wide frequency range. Keep in mind, though, that *for utmost efficiency the antenna should be cut for the lowest frequency of planned operation*. If you are interested in the bands from 80 to 10 meters the antenna should be resonant on 80 meters. That does not mean that you cannot work lower frequencies when using a transmatch and short antenna, only that efficiency will be lower.

Use of a transmatch will do several things for the average ham. First of all, it will allow us to match almost any conductor from a high quality beam antenna to a hunk of wire or rain gutter and operate that conductor efficiently on nearly any frequency. Secondly, the transmatch provides a stage of isolation which will help eliminate interference from nearby high power RF sources,

such as commercial radio/TV stations; and, thirdly, the transmatch will allow us to use almost any feedline for our antenna.

Using a transmatch is not at all difficult, anyone can master use of the device with just a little practice. Considering what the transmatch does for us, I cannot understand why any ham would not want one in his station.

Transmatches are available commercially, or can be easily built at home with a few readily obtainable components.

More info can be obtained from several sources. I suggest the ARRL *Antenna Handbook* and *Lew McCoy on Antennas* (both are available at most ham radio outlets; the former is also available from Grove). Besides info on transmatches, both books contain excellent information on antennas in general.

■ Conditions

During August and early September; 17, 15, and 10 meters have been fairly good, with openings to Europe and South America being quite common. Early evening openings to the Pacific on 15 were fairly good although not frequent.

VHF openings have been very good here in Pennsylvania, and several coast-to-coast QSOs were made on six meters. Europe has been heard, but, alas, not worked on six this season.

Sunspot numbers are slowly climbing, so with luck we will have a good DX season this year.

That's all for November, gang; have a good Thanksgiving and we'll see you next month.

Now Available from Grove: TrunkTracker BC895XLT

The enormous success of Uniden's hand-held BC235XLT Trunk Tracker is now complemented by the new BC895XLT, the most powerful monitoring tool available to the scanning enthusiast. Designed not only for serious scanning of conventional VHF/UHF land, sea, and air communications, but for automatically tracking Motorola trunking systems (I, II, III, and hybrid) as well! Triple conversion design enhances the performance of this new trend-setter.

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A Transistor Checker for Your Workshop

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■ A Practical Low-Cost Tester

Figure 1 shows the circuit for this month's project. It is somewhat a "go-no-go" transistor tester because it does not measure beta or leakage. It is designed for small signal RF and audio transistor testing. Transistors that are used in shortwave and ham radio receivers can be tested with this circuit. This gadget will be handy when you purchase surplus transistors and want to determine they are okay before popping them into a circuit.

Inexpensive 20-MHz surplus computer crystals are used in both oscillators.¹ They need not be cut for 20 MHz. You may use any frequency in the range from 12 to 20 MHz. The general idea is to have oscillators into which we can plug transistors to learn whether or not they will cause the crystals to oscillate. RF output energy from either oscillator (1 or 2) is amplified by Q1, and is rectified by D1 and D2. The resultant dc voltage causes the needle of M1 to deflect upward. The higher the reading the greater the gain of the TUT (transistor under test).

Oscillator 1 of figure 1 accommodates NPN or PNP transistors. S1 allows the selection of these types of BJTs (bipolar junction transistors). Oscillator 2 is set up for testing FETs (field effect transistors). It will test junction FETs, such as the popular MPF102, or dual-gate MOSFETs (metal oxide silicon FET) such as the 40673, Japanese 3SK series or 3N211s. When testing dual-gate FETs you will need to insert the gate no. 1 and gate no. 2 leads in the single gate pin (G) of the TUT socket at oscillator 2.

Pierce oscillators are used in the figure 1 circuit. C1 and C2 are feedback capacitors. They are chosen to ensure reliable oscillation with the crystal used at Y1. Some experimentation with the values of C1 and C2 may be necessary in rare instances. Generally speak-

ing, the lower the crystal frequency the greater the C1 and C2 values necessary for reliable oscillation. Initial testing of the circuit may be done while using a new 2N2222 or 2N3904 transistor. A new MPF102 or 2N4416 should be used when checking out oscillator 2.

Each of the figure 1 oscillators is equipped with a transistor socket to permit plugging in various small-signal BJTs. Sockets are rare, but they can be purchased.²

■ NPN versus PNP Polarity

You may be wondering why S1 in figure 1 is necessary. It allows us to use a positive power supply to test either type of transistor. An NPN transistor requires a positive operating voltage on its base and collector. The PNP transistor is designed to have a negative voltage on its base and collector. A single circuit configuration can be used to accommodate either an NPN or PNP device if the circuit connections are chosen to satisfy the device

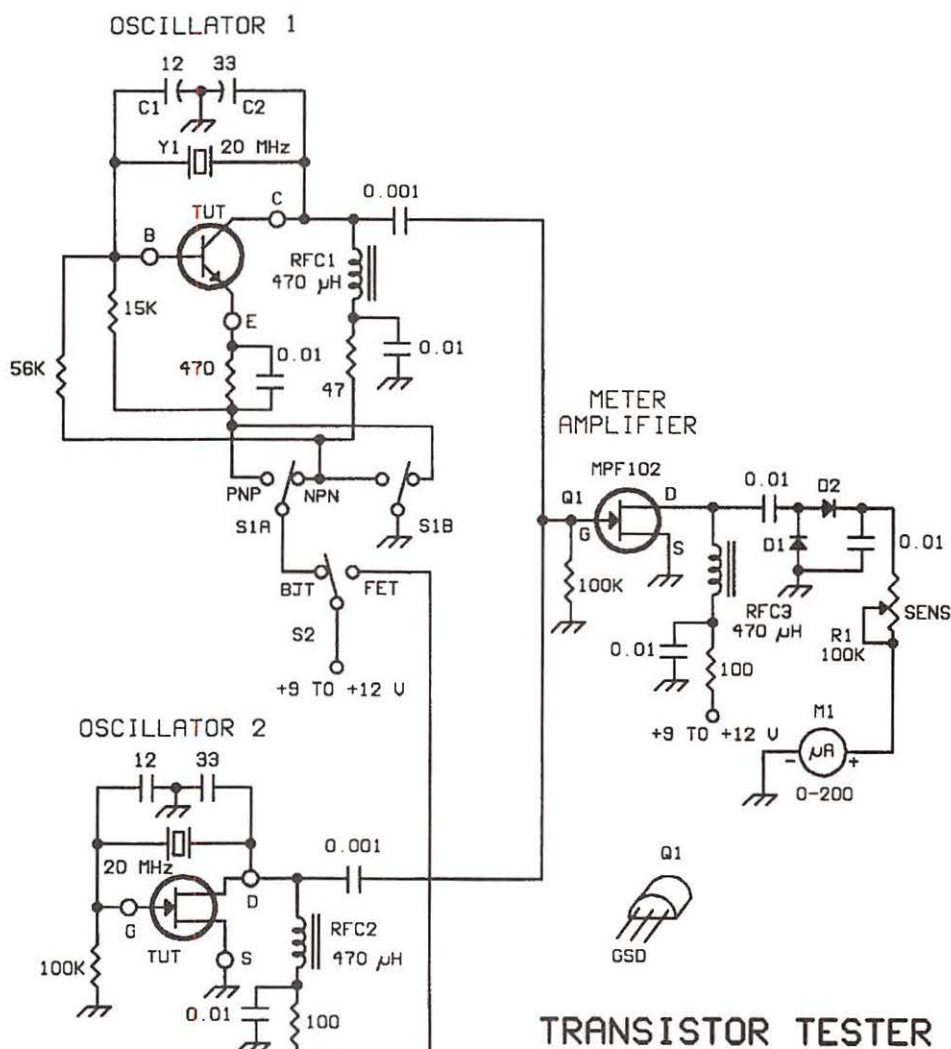


FIGURE 1 — Schematic diagram of the BJT and FET tester. Capacitors are disc ceramic. D1 and D2 are 1N60A or 1N914 small signal diodes. M1 is a surplus 100- or 200- μ A dc meter (see text). Resistors are 1/4-W carbon composition. R1 is a linear taper carbon control. RFC1 through RFC3 are miniature 470- μ H RF chokes (see text). S1 is a miniature DPDT toggle switch. S2 is a SPDT miniature toggle switch. Y1 is a surplus computer crystal.

being used. An example of a negative supply voltage is seen in many imported AM band transistor radios that use only PNP transistors. Their batteries are connected for a positive ground and negative supply line.

Figure 2 shows how NPN and PNP transistors can be arranged to make use of a positive operating voltage. S1 in figure 1 switches oscillator 1 to the general circuit configurations of these simple figure 2 audio amplifier circuits. This information should be useful if you design circuits that employ a combination of NPN and PNP transistors. Only one power supply polarity is required.

Although FETs are also manufactured for positive or negative polarity, it is rare that we experimenters or hams use the P-channel type of FET (they require a negative supply voltage). Our work is usually done with N-channel FETs (positive operating voltage). However, you may configure oscillator 2 in a like manner to oscillator 1 to allow switching the circuit connections as is done with S1. Both types of FETs could then be tested at the flick of an additional switch.

■ Why Use Oscillators for Testing?

Most low-cost transistor testers rely on dc current measurement to determine if a transistor is good or bad. This involves applying a small dc voltage to the base (forward bias) which causes current to flow in the base-emitter junction. This small current encourages the flow of a larger current in the collector. The ratio of the two currents represents the dc beta of the device. This is also a "go-no-go" sort of test, although internal leakage through the transistor junction can be seen with this type of tester.

Transistors have an f_T rating. The f_T is the frequency at which the transistor ceases to produce gain, or has what we call "unity gain," or a gain of 1. By testing unknown transistors in a 20-MHz oscillator we have some idea as to the frequency capability of the device, even though some of the transistors we evaluate may have f_T ratings as high as 1000 MHz. Most audio types of small-signal transistors have f_T ratings to at least 20 MHz, so they can be checked with the figure 1 circuit.

Transistors also have an ac beta characteristic. Thus, if an ac or RF current flows in the base-emitter junction, a greater current will flow in the collector circuit. It is for this reason that the higher the ac beta of the TUT the greater will be the figure 1 meter reading. The transistor will generate greater output power than one with a lower ac beta. The tester can be used for matching pairs of transistors for ac beta.

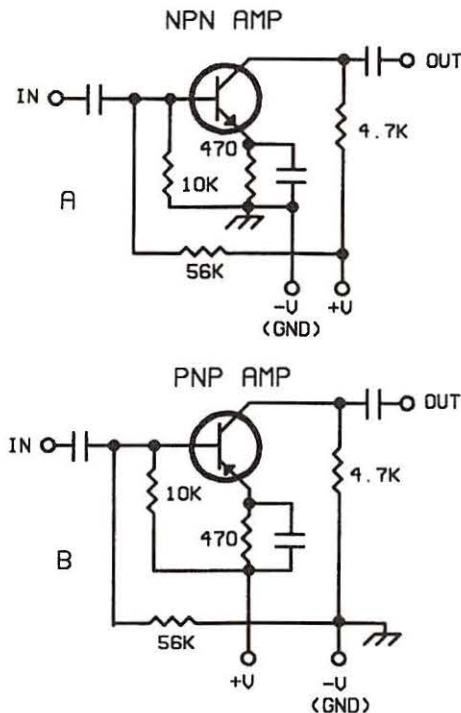


FIGURE 2 — Example of how a positive power supply polarity can be used with NPN or PNP transistors. See text for more information.

■ Construction

Keep all RF connections as short and direct as practicable. The leads that carry dc voltage are not critical as to length, but shortness results in neatness.

Perforated board construction is suitable for this project. Dead-bug construction is okay, too. This tester does not need to be shielded or in a metal enclosure. A small wooden box or chassis is adequate.

M1 is a surplus edgewise tuning meter. Most of these meters have 200 microampere dc movements. The meters in most CB transceivers are suitable also. In fact, any 100 or 200 microampere dc meter is fine for use at M1. R1 is a panel mounted control. It may

need adjustment from time to time, depending upon the ac beta of the TUT.

RFC1, RFC2 and RFC3 are miniature RF chokes. The value is not critical. Any inductance from 220 μ H to 1 mH should work fine.

■ Operation

Insert the TUT in the tester socket, making certain that the leads match the socket connections shown in figure 1. Set S1 and S2 for the type of device being tested. Apply the dc operating voltage and advance R1 to obtain a reading on M1 of 1/4 to 1/2 scale. If the TUT is defective, no reading will be noted at M1.

The tester draws low current (10 mA maximum). Therefore, a 9-volt transistor radio battery may be used. A +12-volt wall transformer is suitable also.

■ Notes

1 — Surplus crystals are listed for a wide range of frequencies in most electronics surplus catalogs. See Hosfelt Electronics, Digi-Key Corp. or Mouser Electronics for low cost crystals.

2 — TO-92 transistor sockets (4/\$1), item no. STR-92, All Electronics Corp., 14928 Oxnard St., Van Nuys, CA 91411. Phone: 1-800-826-5432.

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The Instrument Landing System

Welcome aboard! Today, we'll take a close look at the navigation and landing instrument systems which make aviation even safer than ever.

Instrument landing systems provide navigational guidance for landing derived from radio signals transmitted from ground based electronic aids located at an airport. For accurate use, these facilities are associated with a specific instrument runway and are located so as to serve the touch down point on that runway.

The basic international standard navigation aid for landing at airports is known simply as ILS — instrument landing system. The ILS provides guidance for the pilot in both the horizontal and vertical planes with respect to the instrument runway at an airport. Along the ILS approach path, VHF fan markers (sometimes co-located with LF nondirectional beacons) are provided at two or three positions to supply the pilot with spot-checks as to his distance from the runway end. These are called outer markers (4-7 miles from runway end), middle markers (about 3,500 feet from runway end), and inner markers (1,000 feet from runway end).

An improved installation incorporates a low-powered DME (distance measuring equipment) at the end of the runway to give the pilot continuous measurement of position along the track throughout the entire approach.

Azimuth guidance in the ILS is provided by means of a "localizer" which transmits a narrow-width horizontal radio beam aligned with the runway. Vertical guidance is provided by a glide slope which establishes a fixed angle of approach between 2.5 degrees and 3 degrees above the runway plane.

■ Basic Instrument Approach Procedures

Instrument-approach procedures (IAP) are of two basic types: precision approach procedure (PAP) in which a ground-based electronic aid is provided, and non-precision approach procedure in which no ground based electronic glide slope is provided.

For precision approaches, an ILS or PAR (precision approach radar) is used. Nonprecision approaches use a VOR (VHF omni-directional range only facility), VORTAC (VOR plus TACAN facility), or ADF/NDB (automatic direction finder/non-directional beacon) as the guidance source.

In an instrument approach the pilot transitions from enroute flight to an initial approach

fix (IAF) at a predetermined safe altitude. He then descends to a "final approach fix" (FAF) at an established distance from runway end, at which point he commences his final approach for a landing. Each established IAP serves only a specified runway.

Landing minima are determined by the appropriate authority (in the US, the FAA) for each IAP. In the case of nonprecision approach procedures, these are identified by an MDA (minimum descent altitude) which is the lowest mean sea level (MSL) altitude to which descent is authorized on final approach. For precision approach procedures, the landing minima are identified by the DH (decision height), which is the height above sea level at which the pilot must make a decision to either continue the approach or execute a missed approach.

Whereas all precision approaches are "straight-in" to the runway, nonprecision approaches may be straight in or circling. HAA (height above airport) indicates the height of the MDA above the airport elevation and is published in conjunction with circling minimums. HAT (height above touchdown) is published in conjunction with straight-in minimums.

Landing minima for nonprecision approaches generally are higher than for precision approaches. They also are higher for circling approaches than for straight-in approaches. Variations between different categories of aircraft also may affect landing minima.

Instrument approach procedures play an important part in the control of air traffic as they significantly affect traffic routing and airspace occupancy. Controllers must be thoroughly familiar with all IAPs for airports within their jurisdiction.

■ Inertial Navigation Systems

Inertial navigation (INS) can be used in the air, on the surface, or underwater (inertial navigation guided the *USS Nautilus* in its undersea arctic voyage of 1958). It is most often used, however, in jet aircraft — airline, business, and military. Inertial navigation is "integrating acceleration to determine velocity and position."

In practical terms, this means that an aircraft equipped with inertial navigation needs no contact with the outside world after takeoff. Navigation can be carried out entirely by measurements within the vehicle, without reference to any exterior source of information, on or off the earth. No radio signals are needed from ground stations, no radar navigational instructions are

required. The inertial system "knows" where it is at all times and its flight path can be controlled by the pilot to any desired destination, simply because the aircraft's inertial navigation equipment continuously computes where the aircraft has gone from the known point from which it took off.

The three primary advantages made possible by an INS are: an accurate aircraft attitude reference which is unaffected by acceleration or aircraft maneuvers, a heading reference of extremely high accuracy, and a self-contained global navigation system.

The development of instrumentation for inertial guidance involves mathematics of a very advanced order. The real "breakthrough" was made possible following the introduction in the 1960s of extremely sophisticated gyros and accelerometers, as well as computers of a size feasible for airborne installation. Nevertheless, there was still one instrumental problem in inertial guidance technique that was not completely solved. That was that even state-of-the-art gyros were not perfect. Drift, due to inertia and internal friction, accumulates at the rate of one to two nautical miles per flight hour. Development of design improvements has reduced this problem somewhat.

The inertial navigation display gives the pilot numerical readouts on the following data: present position in latitude and longitude; ground speed and present track; wind direction and speed; distance from desired track; correction required to correct track error; distance/time/bearing to next checkpoint and/or destination; pitch and roll attitude.

Before takeoff, the pilot aligns the system by inserting into the computer his known latitude and longitude, plus the lat/longs (latitude/longitude) of his enroute checkpoints. To update the inertial navigation system, the pilot presses an "update" button on the control panel and "freezes" the display, while the computer goes on operating. Lat/longs of a new fix — obtained from ground radio aids — may be compared with that locked in on the control panel.

Should there be a difference, the old storage data can be changed to agree with the new fix data; and after the update button has been released, the computer will begin to use the new values. Information from inertial navigation can be sent to ground stations via ACARS.

That's all for this month. See you in December. Until then, 73 and out.

Note on advertisement below: As of 4/26/94 it became unlawful to market cellular-capable receivers in the U.S. Atlantic Ham Radio assures us that it will give a full refund and hold customers harmless from shipping expenses if a purchased unit is returned to the vendor by US Customs.

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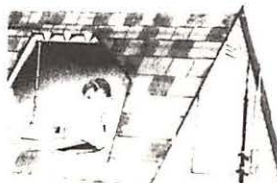
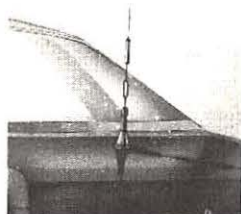
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Modes and P/L Tones Clue to Feds

In recent months the Southwest has been a hotbed of Federal monitoring. Many thanks go out to Chris Parrish and others who do not wish to be identified, for their vital input to this column. Without monitors such as these, this column would not be possible.

The City of Houston, Texas, has been alive with new federal activity according to Chris. There has been a wide area repeater on 408.175 MHz operating in the city for some time now. The p/l tone is 77 Hz. Numerous hours of monitoring failed to produce any identification of the users. Finally the lucky day came and the users identified themselves as United States Postal Service radio technicians. They were using the callsigns *Westgate* and *Stromall*. They kept referring to this frequency as Channel 11. There has been some reference made since then to another repeater in the area on 410.000 MHz.

There are also several federal systems operating in the Houston area using DES speech encryption. They are outputted on 163.100, 168.350, and 164.550 MHz. It is unknown who the users might be. The 168.350 MHz frequency is a multi-agency user channel, and my guess is they are federal law enforcement.

This is an excellent reminder to keep monitoring. You never know what you will hear at the oddest times, such as in the above case of the Postal Service techs. Another example occurred in the Kansas City area recently. Two new repeaters appeared, providing excellent coverage. Both were running DES speech encryption. When digital speech encryption systems such as DVP and DES are being transmitted, the sub-audible tone (or p/l, if you prefer), is not transmitted. The radios have difficulty filtering the low frequency tone out from the digital speech.

After several weeks of monitoring by our reporter, a radio technician who was servicing the system turned off the speech encryption just long enough to allow the p/l tone to be transmitted. The p/l tone was 167.9 Hz — the nationwide tone used by the FBI. Mystery solved: The repeaters were the new FBI machines.

■ New radio toys

Nextel has come out with a rather interesting radio. It is a combined cellular telephone and a trunking radio all in one small package. Of course, it is completely digital. This system has been advertised on television recently. What brings this up is that one of our observant readers in the Chicago area recently observed one of the "three letter" federal types sitting in his "undercover" federal car talking on the radio using the trunking feature.

NEXTEL

With more and more trunking systems being bought up by Nextel, I will stand on the merits of my previous columns and say that the Feds are making the move up to 800 trunking. (See last month's text concerning the federal mandate that commercial radio systems be examined for use *first* before any new federal frequency is to be authorized.) I'll bet it would be interesting to see Nextel's data base of users. All replies will be kept confidential if any of you have proof of federal talk groups on Nextel systems. Any takers?

■ Another Gov Surplus Snafu

Several months ago I mentioned that you can find the most interesting items at amateur radio "hamfests," which are basically electronic fleamarkets. One reader, who obviously wants to keep his identity a secret, purchased a pair of General Electric portable radios at a hamfest in the western New York state area.

Being a technical type, he took the radios to the two way radio shop where he worked and examined the radios. The radios were surplused out by the Border Patrol. A check of the electronic frequency integrated circuit (PROM for you techies out there), revealed the entire Border Patrol band plan for western New York state. Here it is:

Channel	Base Transmit	Base Receive	P/L Tone
01	163.625	162.825	100.0 Hz
02	163.625	162.925	100.0

03	163.625	163.625	100.0
04	163.675	163.675	123.0
05	163.675	162.825	123.0
06	163.675	162.925	123.0
07	163.725	162.825	151.4
08	163.625	162.825	151.4
09	165.2375	166.4375	100.0

■ Monitoring and Modes

In the Washington, D.C., area, the callsign of the communications facility at the Pentagon is *Wheelhouse*. There have been several e-mail messages regarding the complete lack of traffic on their main operating frequency of 268.0 MHz. I am happy to report that our Washington monitors have reported that *Wheelhouse* is back on the air on the above frequency. It should be noted the mode is AM, not FM. The base station has identified itself as "Washington Tactical Switchboard." A telephone call was overheard from PAT599 to a DSN 656-xxxx number.

This brings up the topic of modes of modulation monitored on federal circuits. Normally the land mobile radios use narrow band frequency modulation (FM). There is also some amplitude modulation (AM) to be heard. This will usually be monitored on aircraft circuits. Even though they are aircraft they fall under federal monitoring.

As an example, on September 14, 1997, an F-117 Stealth fighter crashed at an airshow. If you observed the video on your local news station, it is a sight you will not easily forget. Immediately after the incident the 175th Maryland Air National Guard was monitored on 148.100 MHz in the AM mode using the callsign *Raven Ops* to coordinate with A-10 aircraft responding to the crash site. Walkie talkie ground and mobile communications were also monitored in the 148/149 MHz band from *Raven Ops* using FM mode. You just never know where you will find federal operations.

Sometimes federal operations will be monitored using single side band. The frequency of 7700 kHz has been active recently with a mobile identifying itself as *Mobile 740* calling *Rider 4*. This is one of the land mobile frequencies used by the Department of Energy when they transport fissionable material from a manufacturing

site such as Savannah River, South Carolina, to the Pantex plant in Texas.

OK, you say, but what am I monitoring with this *Mobile 740* and its associated base stations? What you are monitoring is the Nuclear Transport Safeguard Network. These are unmarked convoys carrying fissionable nuclear material and nuclear weapons along Interstate 40 from the individual manufacturing plants to the Pantex plant at Amarillo, Texas. This is where the devices are either assembled or disassembled. A shortwave network was the previous backbone of the communications system. This system is now supplemented with cellular, meteor burst, and even satellite transmission capabilities.

Nuclear Transport Safeguard Net

Channel	Frequency
01	3335 kHz
02	5308
03	5751
04	5947
05	7700
06	8013.5
07	9918
08	11555
09	14657
10	17397

NOTE: Channels 1, 3, 5, and 8 are the only ones presently in use and are usually simulkeyed.

The last known control points and their reported call signs are:

Call sign	Location
KRF263	Albuquerque, NM (Net Control Station)
KRF264	Idaho Falls, ID
KRF265	Belton, MO
KRF266	Cheltenham, MD (Headquarters)
KRF267	Savannah River, SC
KRF268	Los Alamos, NM
KRF269	Pantex Weapons Assembly Plant, Amarillo, NM

With more secure communications systems available, the above system is rarely heard, but it is still there.

Federal Monitoring for Newbies

I often get mail from monitors new to federal monitoring wanting to know how to monitor the FBI. They are specifically interested in what frequency ranges to monitor to hear "all the good stuff."

With the new federal bandplan having gone into effect a few years ago, the FBI



channels did complete flips and relocations. Inputs became outputs and vice versa. Old simplex channels disappeared and were replaced by new simplex channels. The bands to monitor for the FBI neophyte are 170-171 MHz, 167-170 MHz, 167-168 MHz, and 163-165 MHz for inputs to the repeaters. The repeaters will be usually outputted in the 167-168 MHz range. The inputs will be found in the 162-164 MHz range. There are some repeaters in the 170-171 MHz range with various inputs.

With the rise of the federal trunked systems, referred to as FEDSMR systems (Specialized Mobile Radio), there is activity to be found on these trunked systems in the 406-420 MHz band. The federal trunked bandplan is published in this column periodically.

With the now confirmed information that federal agencies are moving up to 800 MHz trunked commercial systems, be on the lookout for the FBI to show up on the Nextel systems and also on state police trunked systems. For example, I have received information from a "previously reliable source" that the FBI has its own talkgroup on the New Jersey State Police 800 MHz statewide trunking system. Let's get those "trunk trackers" working!

Casual Listening in California

Ed Ashcraft, a regular contributor to the Fedcom email list, provided me with some logs of his recent cross country trip from Southern California to the East Coast, where he will go to work. Here are some of his more interesting intercepts in the California area.

Frequency	Notes
414.450	Oakland..Robert calling CONTROL, then DES scrambling
167.7725	FBI surveillance--Oakland
167.6375	FBI surveillance--Oakland
163.2000	U.S. Marshall--Oakland
167.6875	FBI--Oakland
166.2750	FBI--Oakland
414.1599	Paired with 166.275. I-580 to Stockton
170.0250	Dublin--clear voice, unknown user
164.3250	Lawrence Livermore Labs
171.6500	Yosemite Valley Interior Opns
166.3000	Wesley--unknown user
167.6625	FBI--712 calling 312--Stockton
167.6625	FBI--904 calling 900--radio techs
418.9000	DEA--Newman
169.0500	DES encryption--Dos Palmos

169.0500	DES encryption--Santa Neda
163.2000	U.S. Marshall--Dos Palmos
167.6625	FBI--900 calling 908--radio techs again
169.0500	Unknown user--had suspect at gunpoint
167.2125	FBI--DES--Dos Palmos
165.2375	Customs--LIMA 950 calling 200--Dos Palmos
167.3875	FBI--parallel to 167.2125--Dos Palmos
163.9375	FBI--input to 167.2125
167.3875	FBI--902 calling --radio techs again
418.2250	IRS Intelligence--Dos Palmos
163.4125	Unknown user--Medina
418.8250	Edwards Air Force Base--DES Encryption
419.3250	Same as 418.8250

Notes from Readers

- The great outdoors has brought about some interesting monitoring this summer. One reader wanted to know about the Tennessee Valley Authority (TVA) Police. They operate a repeater system on 166.325 MHz. Their main transmitter is in Golden Pond, Kentucky, and can be heard throughout western Tennessee and Kentucky. These people are federal police with full police powers anywhere TVA has a presence. They do complete criminal investigations and work traffic control, both on roads through TVA property and also on TVA waterways.

- Another of our readers was at the New Mexico State Fair in Albuquerque last month. He observed a U.S. Army Corps of Engineers boat on display. What was interesting was the communications system on the vessel. Previous columns have reported the COE frequencies confirmed in the 160 MHz band. This boat had a 400 MHz gain antenna on it. Our monitor observed, judging from the length of the antenna rod, that it was in the 406-420 band. Beats me ... Any ideas?

- Here's a mystery reported by a monitor in the Bourne, Massachusetts, area. In the morning hours, while the dew is still on the ground, he can monitor a data signal on 418.350 MHz coming from down in the New York/New Jersey area. When the sun comes out and burns off the fog, the signal disappears. It apparently is a part of a trunking system in the federal band. Any clue?

- With the recent dry weather in Southern California, the Bureau of Land Management has provided some excellent listening if you are into monitoring fire fighting equipment operations. The air-to-air tac frequency of 170.000 MHz is where the action is.

- One final monitoring report before signing off: the Putnam City, New Jersey, FBI field office operates on 167.4125 MHz—with DES digital speech encryption.

Satellite TV Handbook and More

There's a crispness in the autumn air, frost is settling on the dish, and the gas-fired, fake logs crackle in the fireplace. It's November, and what better time is there for settling into that cozy recliner and plowing through a good book?

So, what's on the table next to that chair? Hmm, *Satellite & TV Handbook* which modestly advises it will tell you "...everything you should know about dishes." Then there's *The GPS Manual - Principles and Applications* which one of the authors says "... is a book about American technology at its best." And, finally, there's *Digital Satellite TV* (the 5th edition of Dr. Frank Baylin's Ku-Band Satellite TV) which, weighing in at nearly three pounds, doubles as an exercise program.

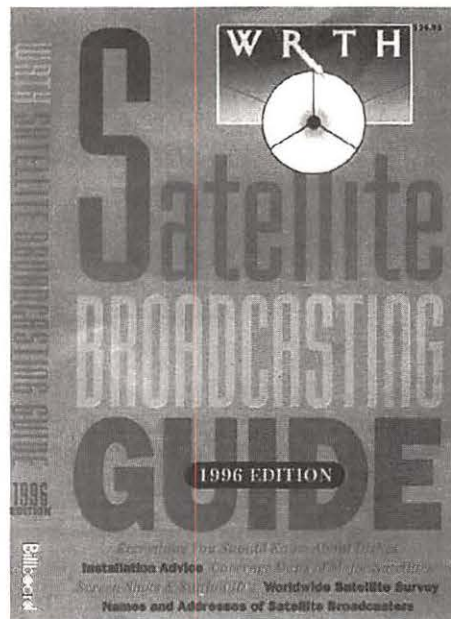
■ *Satellite & TV Handbook*

This is the fourth edition of what used to be called *Satellite Broadcasting Guide* and is brought to you by the same folks who produce the popular *World Radio Television Handbook*. This time around Managing Editor Bart Kuperus has managed to dispense with the advertising and, at the same time, add another 16 pages. By shrinking the type and doubling the columns per page, this edition packs far more than 16 extra pages.

But, the more things change, the more they stay the same. To prove this old adage, the first 76 pages of the books, with the exception of 10 pages of Q&A about DBS, remain unchanged since the first edition of the book in 1994. Newcomers to the satellite TV field will appreciate this brief but useful introduction to the subject. This section, covering satellite history, orbital theory, basics of satellite reception, installation, and enough frequency charts to satiate the frequency counters among us, does a good job.

But, the essential reason for having this dandy little reference book on your shelf are the chapters on satellite coverage zones (80 pages of nearly 100 satellite footprints from around the world) and chapters 9 through 11 on transponder loading for ITU regions 1, 2, and 3. The footprint maps are particularly useful for those wanting to know if a given satellite can be received at their given location. And the transponder loading charts tell us what's on each transponder of each satellite.

Chapter 12 re-runs the information in chap-



ters 9 through 11 in alphabetical order, a way to cross-reference a particular bit of data. The final five chapters list programmer names, addresses and websites; an exhaustive almanac of world television in a country by country profile; and a glossary of satellite terminology.

Here's how the *Handbook* is supposed to work: let's say you want to receive a particular audio or video service. First, find that service in the alphabetical listing; now look for it in the transponder loading chart; now check out the footprint chart to ascertain if you're even near the footprint; and, finally, check out the dish size chart to see how big a dish you'll need for decent reception.

Let's test drive the *Handbook*. Now, suppose I live in Brasstown, North Carolina, and I want to watch the BBC World Service direct from England. My first problem is that there is a mountain directly to the east of my satellite dish. So, I move to my beach front home on Cape Hatteras. With no obstructions, I can now look up BBC World Service in the alphabetical listing and I find that there are four listings. One is an Arabic service, in the Ku-band, spot beamed to the mid-east. Next is BBC Prime on Intelsat 601 at 27.5 degrees West in the Ku-band with a spot beam to the west. Sounds more promising. Next is BBC World on Eutelsat II at 13.0 degrees east with a beam to Europe only. Forget it. And, finally, there's BBC World on PanAmSat-4 at 68.5

degrees east in the C-band and beamed to the eastern hemisphere. Well, that's out too. Looks like my only hope is BBC Prime.

Now, to the transponder chart. This chart tells us that BBC Prime is, in fact, on 601, transponder 1 on the Ku-band side and is in the D2-MAC mode using the EuroCrypt encryption system. Let's pretend I have such a decoder and it's authorized (remember, this is science fiction). According to the footprint, chart 601's Ku-band western spot beam never leaves the friendly confines of the European Union. Well, it was a nice try. The point is that these charts are a great educational tool and without too much trouble you can find out what's really possible given your location.

The Satellite & TV Handbook is not without its shortcomings. There is the bit of trouble with out-of-date information which is bound to happen with any publication. Some information is simply in error. But, on the whole it's well done.

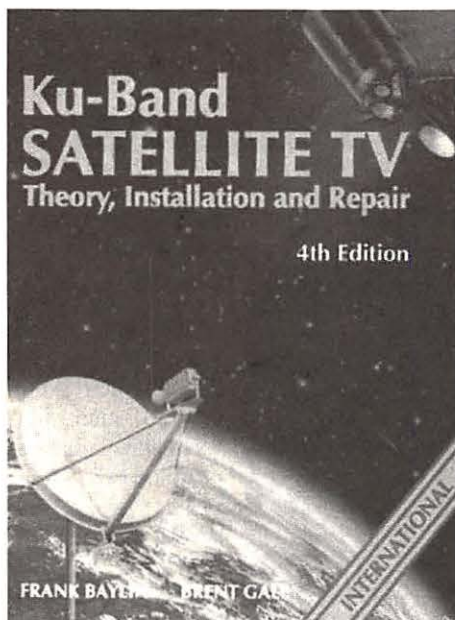
What I'd most like to see in the next edition (the success of previous editions leaves no doubt as to the future of this publication), is a list of satellite equipment manufacturers with their toll-free numbers, websites, etc.; a list of companies engaged in repair of out of warranty satellite gear; a list of relevant publications; and a treatment of other satellite services such as Single Channel Per Carrier (SCPC), FM², and data services.

The Satellite & TV Handbook is compact, well organized, packed with useful information, a good place for beginners to start, and handy reference for the veteran TVRO enthusiast.

■ *Digital Satellite TV*

Dr. Frank Baylin is a one-man publishing hurricane. With an assortment of professional cohorts, Baylin has produced some of the most useful satellite television related books in the entire industry, many of which have become industry standards. Among his titles reviewed in this column over the years are: *World Satellite Yearly*, *Miniature Satellite Dishes*, *World Satellite TV and Scrambling Methods*, *Home Satellite TV installation and Troubleshooting Manual*, and *Wireless Cable and SMATV*.

Digital Satellite TV updates his book on Ku-band satellites first published in September of 1986. Yes, eleven years ago, when the



hot topic was satellite TV scrambling, the good Doctor was writing about Ku-band television, satellite TV's real future. To say that this massive 465 page book is thorough is an understatement. And it's not just about Ku-band satellites—everything from component design to the Internet is explained in plain, understandable writing which takes the reader step-by-step through some of the most technical aspects of satellite communications.

As with his previous efforts *Digital Satellite TV* is an enormous achievement. There is no way to fully describe the ocean of information contained in this book. The table of contents itself is twelve pages of small type. There are hundreds of photos, charts, diagrams and worksheets. The chapter on "Installing Satellite TV Systems" is 80 pages long and could be a stand-alone book. The chapter on "Mobile Applications" lists the address and phone numbers of no fewer than 15 companies making receiving equipment you can put on your RV or yacht. There are thorough chapters on "Troubleshooting & Repair" and "Satellite Receiver Design."

The "Receive Site" chapter covers every conceivable configuration of antenna, mount, feed, low noise amplification, and down-conversion and takes 73 pages to do it. Discussions of cable and wiring are almost microscopic in coverage.

What's left? Plenty! There's digital audio and video compression and transmission schemes; uplink sites, satellites, selecting equipment; and upgrading systems. If you read this book from cover to cover you'll be an expert, too, because this is a great textbook and Baylin is a gifted teacher. This book would easily be worth \$100 in the satellite

trade, but the cover price is just \$50. If you're serious about all aspects of satellite technology you must have this book.

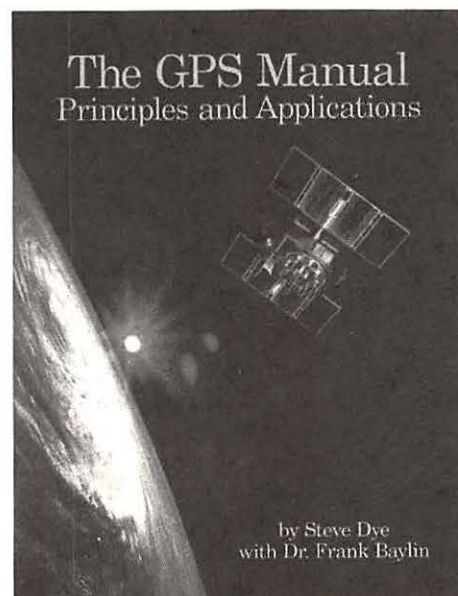
■ The GPS Manual

Subtitled "Principles and Applications," this is another Baylin effort. This time he's teamed up with Steve Dye, "Navigation Satellites" editor at *MT*'s sister publication *Satellite Times*. This 276 page book is a thorough, authoritative exploration of the ultimate system of navigation.

Beginning with a fascinating look at the history of navigation from sextants to radio beacons *The GPS Manual* brings us to the point of monitoring the first satellites in the late 1950's. Forty years later we land squarely into a time of sophisticated, hand-held receivers with astonishing accuracy and costing under \$100 which launched an industry grossing billions of dollars a year.

The chapter entitled "GPS Applications" shows us that using this system for navigation is just the beginning. Aside from the obvious advantages of using GPS in air and sea navigation, GPS is quickly finding uses in land navigation for tracking rail and truck freight; taxi, public transport, and emergency vehicle location; surveying; monitoring seismic activity; yield mapping; crop dusting; "smart" highways, and electronic security. The sky's truly the limit!

There are detailed chapters on the operations of these satellites, using a GPS receiver, and a "Survey of GPS Receivers" which is over 100 pages long and lists nearly a dozen GPS manufacturers and dozens of their products. I can't imagine that anything has been left unsaid on this subject in this enormous



work.

This book, like all Baylin publications, includes a 19 page catalog of publications and products which appears at the end of the book. There are also extensive ads for related products and publications throughout the book. *The GPS Manual* is designed to be used as a classroom textbook and includes a list of exercises for students to complete at the end of each chapter. *The GPS Manual* retails for \$40.

■ Where to Buy

All three of these titles are available from the Grove Buyer's Guide (800-438-8155). The *Satellite & TV Handbook* is also available through most retail book sellers. Baylin publications and products may be ordered directly from Baylin Publications 1905 Mariposa, Boulder, CO 80302. Phone: 303-449-4551 FAX: 303-939-8720.

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Upgrading WiNRADiO: Receiver Sensitivity

This is the second of a series of performance and feature upgrades for the WiNRADiO wide-spectrum communications receiver. The first upgrade (last month) offered detailed instructions to reduce crossover distortion. My September column had the instructions for safe and completely disassembly of the WiNRADiO receiver. Please save those columns for posterity!

This month, we will improve WiNRADiO's sensitivity by increasing the isolation between the AM and NFM filter paths. It's easy and shouldn't take much time, and will bolster your confidence to dig deeper into WiNRADiO for the heavier stuff that's to come later.

Receiver Sensitivity Improvement

This easy hack is in the mixer/output circuit of U2, Pin3, the NFM Discriminator. You will need the following three surface-mount parts and a short hookup wire:

Capacitor	0.1- μ F SMT 0805 X7R
Resistor	12-kohms SMT 0805 5%
PIN Diode/ VHF/UHF switch	MMBV3700-LT1 or HSMP-3830 or 1SS314 or MMBV3401-LT1
Insulated Wire	4" 22-24 ga, solid

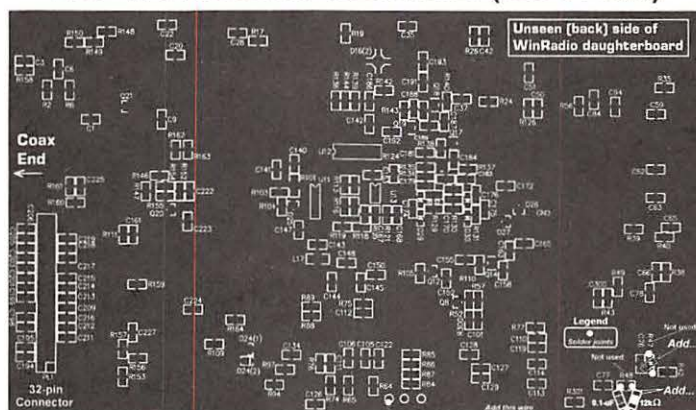
The capacitor and resistor are standard parts available anywhere. The PIN diode isn't so standard, but any on the above list will work fine; it's not critical. Just observe polarity; that's critical.

Ten Easy Steps

Refer to Figures 1-2 and follow these steps:

1. Disassemble WiNRADiO per instructions given in my Sept 97 column.
2. On the normally unseen (back or bottom) side of the smaller WiNRADiO daughterboard, locate the spots for unused R47.
3. Solder the PIN diode so that its cathode is at the lower pad of R47 and the anode is at the upper pad of R47.
4. Locate the spots for unused R48.
5. Solder one end of the 0.1- μ F (size 0805) chip capacitor to left-unused pad of R48.

FIG-1: DAUGHTERBOARD (BOTTOM)



Angle it slightly as shown in Figures 1 and 2. 6. Solder one end of the 12-kohm (size 0805) chip resistor to right-unused pad of R48. Angle it slightly so that its unsoldered end touches the unsoldered end of the 0.1- μ F capacitor installed in Step 5.

7. Solder the touching bottom ends of the 0.1- μ F cap and 12-k resistor so that the ends are bonded together.

8. Solder one end of a 22-24 ga insulated hookup wire to the junction made in Step 7.

9. Locate the three round solder pads just below R84 (about 2" to the left of the new resistor and capacitor), and route the hookup wire to the leftmost of the three pads (the one closest to R64). Route

(and trim to length) the hookup wire so that there is no slack and so that it makes a straight path along the bottom of the board; then solder it to the leftmost of the three pads. Again, see Figures 1 and 2.

10. Check all your work; ensure correct polarity of the PIN diode; ensure that solder blobs can't touch other pads and/or components; reassemble WiNRADiO.

That's all there is to this one, folks! It's another step to elevate you to higher consciousness and reinforce your confidence for future work on the innards of WiNRADiO.

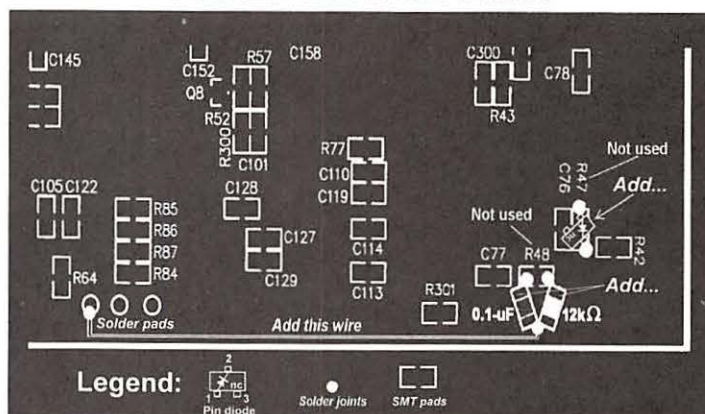
Discriminator and Detector Outputs

Like all receivers, WiNRADiO has the ability to detect digital and other non-voice signals such as pagers (POCSAG), Morse Code, RTTY, FAX, AMTOR, ASCII, etc. Mere detection of such signals isn't enough and it's usually fruitless to tap

these signals at the headphone or speaker terminals for external processing due to internal voice band filtering that lops off much of the data. (See the March-96 and May-97 *Workshop* columns.)

Generally speaking, external signal processing is best done on signals tapped from their sources or points of detection, e.g., the detector for AM signals and the discriminator for FM signals. The best source of unfiltered line level WFM and AM audio signals in WiNRADiO is at TP-29 or U5, Pin 9 (TA7640AP). For NFM signals, take the output from TP-20 or U2, Pin 9 (MC3372D). Should you need to extract data from SSB

FIG-2: DETAIL VIEW



signals, tap the output of U6, Pin 1 (LM324M).

Signal taps should always be via a 1.0/25v to 2.2- μ F/50v tantalum capacitor, (+) to the tap point and (-) to a shielded mini-coax to your output jack mounted on the back of the

radio somewhere. WiNRADiO's backplane screw-down bracket has enough room to mount a mini phone jack or two for your line level outputs. Use a shielded coaxial patch cable from any such jack to your external processor device.

I have kits of parts for the first four WiNRADiO mods for those who don't want to sweat the minimum orders required by some vendors, as well as to ensure that all the exact parts are handy for those who aren't all that accomplished on the SMT parts scene yet. Twelve parts and the 4" wire come in a packaged "kit" for US\$7.00 domestic and for all foreign, it's US\$10.00 ppd, surface. Allow more for airmail. Order my part no. WRKit1-4. You can, however, get most everything you need from DigiKey (800) 344-4539; Mouser (800) 346-6873, and/or Future-Active (800) 655-0006.

■ More Information

The latest information and software updates for WiNRADiO are available at their US Web site at <http://www.winradio.com> and at the Australia site: <http://www.winradio.net.au> If you don't have a WiNRADiO, you can still download the software and run it in demo mode. I freely provide tech support on the WiNRADiO mods and all my MT articles by e-mail or (heaven forbid) postal mail that includes an SASE. Fax inquiries are fine, but cannot be fax-replied. Please include your e-mail address if you need a reply.

■ Computer Upgrade Update

My four-column series from Nov-95 through Feb-96 gave details on how to upgrade or build your own PC/compatible 486 computer using the R407e motherboard. My oh my, how times change! You can't get the

R407e board anymore, and worse, 486 CPU's are generally unavailable, too. The rest of that four-part series is still okay from a broad perspective, but there is no sense in building a 486 computer anymore, even if it is your first one. The Pentium class and the PCI bus are now the only way to go. Fortunately, economics can still play a role without sacrificing performance.

The Tyan Computer Corporation makes a motherboard that meets my specs for high performance at low cost (under \$150 w/o CPU) and great flexibility for growth, expansion, and upgrading. Their S1563S Tomcat III with 512-kB cache is easily one of the best choices for the apprentice builder and radio hobbyist. (Even the pro's like it.) It's small; fits in any case or chassis, and lets you do all you want to do in modern computing. Caveat: Just don't settle for the 256-kB cache some Tomcat III boards come with. They're a few dollars less, but the difference isn't worth the compromise. Insist on 512-kB cache — it's important!

The S1563S is a quality single-processor motherboard based on the Intel Pentium (and AMD/Cyrix equivalents) microprocessors. This motherboard is designed around the fast Intel 430HX chipset and can support CPU speeds of 75 MHz through 200 MHz.

The S1563S supports EDO memory, Burst EDO, ECC, and memory parity checking. The S1563S's PCI Local Bus provides high performance capabilities that are ideal for a wide range of demanding applications such as: CAD, CAM, CAE, networking, multi-user environments, database management, desktop publishing, image processing, and 3D animation.

This integrated "baby AT" form factor system board is well made and reliable. Some of the standard included features are: on-board dual channel PCI IDE, on-board floppy

controller, on-board high speed (16550) serial I/O, Universal Serial Bus (USB) and on-board PS/2 mouse connector. (USB and PS/2 mouse cabling/jacks sold separately). You may not know much about the Universal Serial Bus yet, but the Tomcat III has USB for when it becomes a standard. Keep an eye out for peripherals and software that support USB!

Flexibility and expandability are standard by design in the S1563S. With on-board

I/O and drive controller support, the four PCI and five ISA slots (one ISA and one PCI are shared) are free for add-on expansion cards. Eight 72-pin SIMM sockets offer a flexible memory configuration of 8MB to 512MB of RAM.

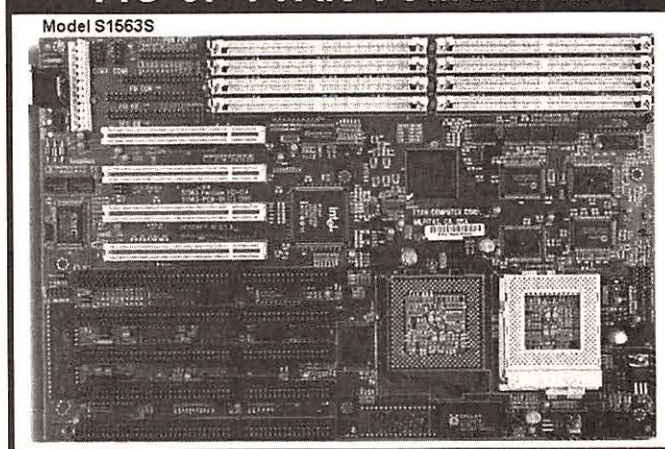
The Tyan Computer Corporation has an excellent Web site at: <http://www.tyan.com/> and the Tomcat III board can be seen in detail at: <http://www.tyan.com/html/products.html> Other contact points include: TYAN Computer Corporation USA 1753 South Main Street; Milpitas, CA 95035
Sales: (408) 956-8000
Support: (408) 935-7884
Fax: (408) 956-8044
BBS: (408) 956-8171
Email: info@tyan.com

SPECIFICATIONS OF THE TOMCAT III:

Processor
Intel Pentium 75-200MHz Processors
Cyrix P120+, P150+, P166+
P55C with MMX
#7 ZIF Socket
Chipset: Intel 430HX
Main Memory: 8-512MB
Eight 72-pin SIMM Sockets
Fast Page Mode or EDO Dram Support
EDO / FPM w/Parity / ECC Support
3.3v and 5.0v DRAM Support
Cache Memory - On-board 256K or 512K Burst Cache
Expansion Slots
Four 32-bit PCI Bus Mastering Slots
Five 16-bit ISA Slots
One Shared PCI/ISA Slot - 8 slots usable
On-board PCI Bus Mastering IDE
Two PCI Bus-Master enhanced IDE Ports
4 HDD + EIDE CD-ROM Support
Bus-Mastering DMA Mode 2
PIO Mode 3 & 4
On-board I/O with IR support
Two Floppy Drive Support
Two 16C550 High Speed Serial Ports
One ECP/EPP High Speed Parallel Port
2 USB Ports
One IR Port
PS/2 Mouse port using IRQ 12
Flash BIOS
Award or AMI BIOS
Green PC Compatible
Microsoft Plug and Play Ready
Physical Dimensions
Baby AT (8.66" x 13.25")
Warranty - 2 Years

With this Tomcat III board, you need only a CPU of choice, 8-MB or more of RAM, and a PCI video card to get up and running, assuming you already have the basics of keyboard, mouse, monitor, and disk drives. The cost to roll your own or upgrade your old clunker could be as low as \$200-\$500, depending on what you already have available. The Information Age has dawned and is beginning to roll like a juggernaut. You may as well get ready for it. At least think about it and be open to new ideas.

FIG-3: TYAN TOMCAT III



Back To Basics

During the past few months we have discussed many different aspects of "computers and radios"; the computer industry, how radio technology is developing, and how other forms of communications are effecting the radio industry. But this month we return to our roots and look at a number of software products.

■ A Base of Scanner Operations

In order to catch the latest on your VHF/UHF scanner you must know who is on what frequency in your geographical area. That means you either need a friend who is a dispatcher for the local police, or better still, a frequency database. ScannerBase, by CSP Technologies, may be just the "ticket." ScannerBase comes on a CD, installs in seconds in Windows 95 or via DOS 3.1 on a 486-33MHz-or-better PC with 8MB of RAM. Of course a CD-ROM drive is required.

Its loading and use is so simple no instructions are required. ScannerBase asks the user to compose a list of search criteria, as all databases require. The difference with

ScannerBase is that you are led through the options and presented with easy to understand and operate "choice windows." In Figure 1 we see the choice window to allow the user to pick which service frequencies will be included. Similarly, you are asked to enter the name or zip code of your receiving location and that of the towns where the transmissions may originate. Once you make all the choices, your new search program is automatically stored in any name you care to give it and then the results are displayed (Figure 2).

■ Blinding Speed

Making your search selections takes just a few minutes. Most searches I made were completed and the frequencies displayed within seconds! Of course this will depend on the number of stations which meet your search criteria. But relative to other databases I have used, this one is pretty fast.

Once the search is completed and the resulting list is displayed, clicking on a station opens a station details box. This is displayed on the right side of Figure 2. With this infor-

mation you can track down the exact location of the station since its longitude and latitude are given.

■ How Does It Compare?

One of the first frequency databases that we looked at a number of years ago was the Grove database. This product has gone through a number of revisions over the years but still remains as a standard. Although ScannerBase gives station longitude and latitude data, one version of the Grove database provided a mapping feature which drew a map of the station area including roads, landmarks, and the exact location of the station. But, the Grove program with mapping was significantly slower than ScannerBase.

In my opinion ScannerBase really beats the competition in two areas: ease of user interface and speed of search. ScannerBase is so easy to use that you will be composing lots of new searches. One fact that must be noted in any program based on Federal Communications Commission (FCC) data is the necessary lack of military and aeronautical stations, since these are allocated by the Interdepartmental Radio Advisory Committee (IRAC), not the FCC. (See Bob Grove's Closing September *Closing Comments* for the current status of public access to this information.) The inclusion of these stations would make ScannerBase a true scanner database, and we can only hope they will become available soon.

You can try ScannerBase at www.csp@tech.com. It is available for \$29.95 plus S&H from CSP Technologies at 1-888-857-4240. Tell them your friend John from MT sent you.

■ A Propagation Wizard

Well, we all know we need one. Good thing the guys who have been predicting great DX conditions being just around the corner are not our financial advisors! These people have clearly illustrated the dangers of using an equation without fully understanding the assumptions, valid range of conditions of each variable, and under what geophysical/astrophysical conditions historical data points can be extrapolated.

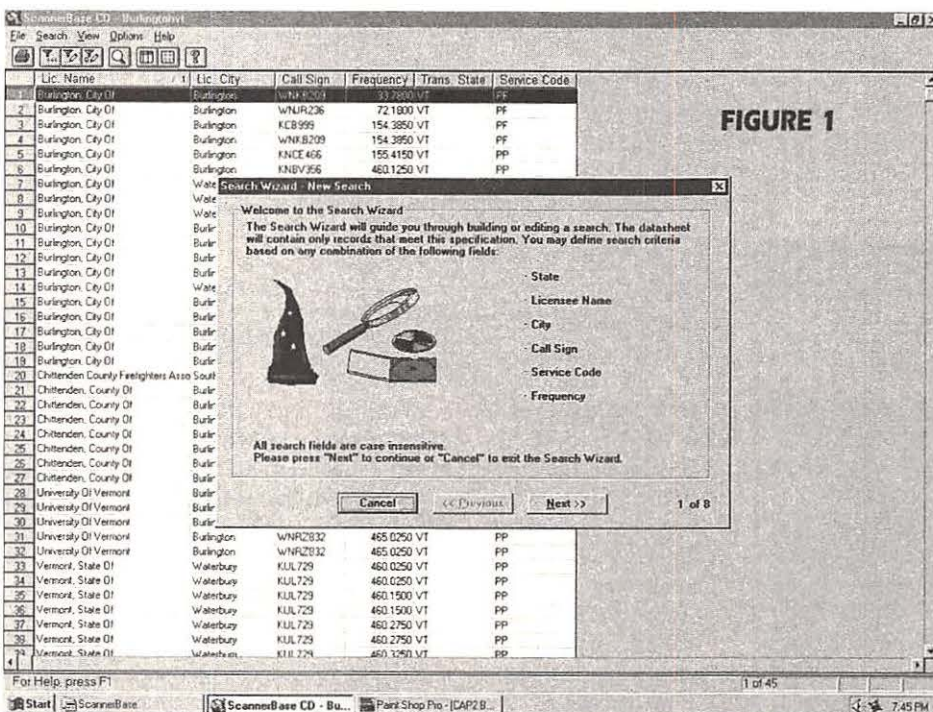


FIGURE 1

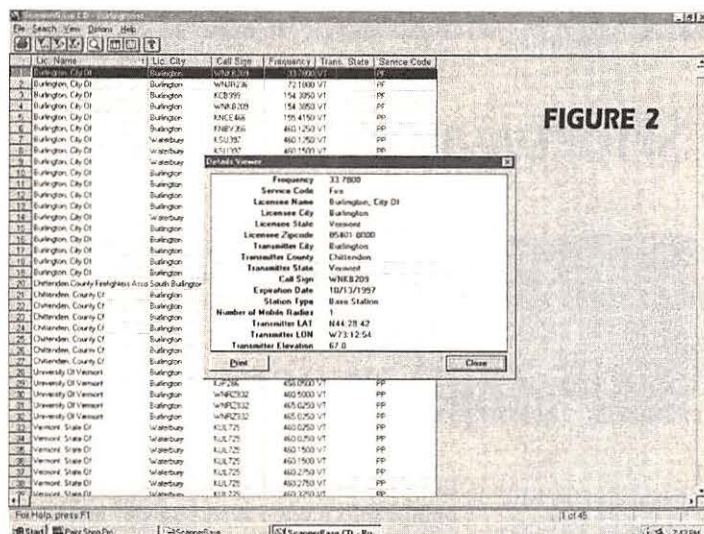


FIGURE 2

ScannerBase Search Results & Station Detail Windows

Whoops, sorry. I try *not* to sound like a physicist when we discuss such topics, but it's important to understand the limitations of predictors and predictions programs. As has been accurately stated, "garbage in, garbage out."

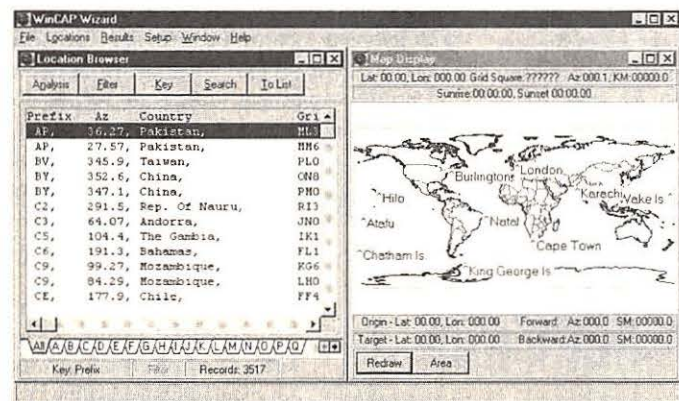
Having said that, a new communications analysis prediction program has been developed by Kangaroo Tabor Software called WinCAP Wizard ... Did I hear someone say, "but Tabor also produces a propagation program called CAPMan!"?

This is true. So what are the differences, if any? Let's give it a quick look.

Installing and Using the Wizard

WinCAP Wizard comes on a single 3.5 inch floppy and installs easily. Running it under Windows 95 on a Pentium 133 MHz computer is just as easy. The user enters his station location in a pulldown Setup menu (see Figure 3). Then the geographical location of the other side of the communication circuit location is picked. This can be done in a

FIGURE 3 - WinCAP Wizard's Opening Screen showing list and graphical location of stations



number of ways. Graphically, the program allows the user to point to a location on a world map. The closest city located to that point in the program's database is utilized. Alternatively, we can go to the location list and search it by country, city, or other "key" to find the desired location.

Show Me the Results

Wizard lets the user produce the results of the propagation analysis in the form of four different, and very useful, reports: Best Band Summary, All Band Summary, Band Summary, and Dynamic Band Summary, using five different signal propagation parameters. All reports are presented in concise, but simple to understand forms.

CAPMan, Wizard, and IonCAP

OK, now stay with me. IonCAP is an ionospheric model which both CAPMan and Wizard programs use to make propagation versus frequency prediction between locations on the Earth. So the question is, what is the difference between CAPMan and Wizard?

Well, as Tabor Software themselves say, "Wizard balances ease of use with information requirements. CAPMan goes for maximum detailed information reporting, with an associated steeper learning curve." So there you have it. Wizard does not require the user to input a large number of complex parameters in order to obtain a prediction.

Nothing is ever for free. Therefore, as the company statement suggests, fine tuning accuracy may suffer. However, at \$29.95 (+ \$5 s/h) Wizard is very easy to use and the least expensive of any commercial IonCAP-based propagation prediction program.

WinCAP Wizard is available from Kangaroo Tabor Software, Rt. 2 Box 106, Farwell, TX 79325-9430. Also check

their website at www.wtrt.net/~ku5s. But, remember my initial comments concerning prediction programs of any type.

Wrap Up

Well, we have spent all of our time together looking at a couple of very powerful and easy-to-use radio-related programs. \$30 can still buy a lot of software to assist you in radio monitoring, if you know where to look and understand the program's limitations.

On Edit/Setup/Scan/Sort/Display/Manual/Config/About

Mon Mar 17 16:52:48 344.00000 FM Broadcast Radio Studio-Xmtr Link Interfcty
Mon Mar 17 16:49:40 928.01250 FM Domestic Pub Radio Svc Private Mult-Address
Mon Mar 17 16:48:15 156.12000 FM Highway Maint

60
40
20
0

Broadcast Radio Studio-Xmtr Link Interfcty Mon Feb 17 16:27:21

944.00000 FM [PAUSE] [LISTENING] [9] [5] [6]

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Science and Shortwave

Whenever and wherever polled, shortwave listeners consistently rank programs about science and technology as one of their three or four most favorite. This topic area is another in which shortwave and international broadcasting shines when compared to that offered on the subject from domestic commercial radio in North America.

In the listings which follow, the stress is on programs which focus on science and technology in their widest sense. In general, programs specializing on more narrow topics like communications, health and medicine, or the environment are not included here. (We'll treat those programs more completely in a subsequent column.) The sole exceptions are for programs which appear in a regular rotation of science programs under an umbrella title.

For the most part (with the notable exception of those on the BBC World Service, Radio Netherlands and a few others), each station's science and technology programs understandably tend to highlight science and technology matters related to the station's sponsoring nation. Stations not listed below generally don't offer programs specifically devoted to science and technology. However, coverage of these topics are often and regularly provided through daily magazine style programs that cover a range of topics.

Please consult *MT's Shortwave Guide* for frequencies and transmission target areas of the broadcasts listed, as well as for the broadcast times, frequencies, and target areas of stations from countries of interest not listed in this article. Remember that dates and times are in UTC. Times marked with an * will shift one hour later when local seasonal time changes are made in the spring. Programs and times were checked for correctness at press time, but stations may have made changes in the interim.

■ All India Radio

Window on Science is a program which highlights Indian scientific research and discoveries. It airs on the second and fourth Wednesdays of the month at 1030, 1425, 1830, and 2215; and on the third Thursdays of the month at 2330.



■ BBC World Service

As one would expect, the full service BBC offers a full range of regular programs on scientific topics, each with its own unique perspective and emphasis.

Discovery is the most technical of the BBC offerings. It focuses on scientific development and research and, to some extent, assumes that the listener has more than a cursory background on the subject. Listen via the Americas/Europe stream on Tuesdays at 0530 (on frequencies targeting the Americas only), repeated Wednesdays at 0130 and Thursdays at 1030. *Discovery* also airs on the Africa stream Tuesdays at 0915, repeated Wednesdays at 2130 and on the Asia stream on Tuesdays at 0230, repeated at 1430 and 2130.

Science in Action has a wider and somewhat more accessible approach, offering the listener a "current events" angle by highlighting the science news of the preceding week. On the Americas/Europe stream, the program is broadcast on Fridays at 1530, repeated Saturdays at 0530 and 1830. Via the Africa stream, it can be heard Fridays at 1930, repeated Saturdays at 0730. The Asia stream has it at 1430 on Fridays, repeated at 1830 and on Saturdays at 2330.

The Works is a new program inaugurated earlier this year that looks at technology and its impact. It airs on the Americas/Europe stream Saturdays at 0915, repeated Tuesdays at 0530 (on frequencies targeting the Americas only), Wednesdays at 1830, and Fridays at 0130. The Africa stream has it at 0915 Mondays, repeated Thursdays at 1930. The Asia stream presentations are at 0230 Mondays, repeated at 1030 and on Fridays at 2130.

A rotation of quarter-hour programs on various science-related topics is packaged under the umbrella title *Science Extra*. The monthly global astronomy report *Seeing Stars*



SCIENCE AND TECHNOLOGY

runs during the first week. *Soundbyte* checks out the information superhighway and computers during week two. *Wildtrack* is a nature magazine airing in the third week of the month. *Waveguide* examines international broadcasting in week four. And in months with a fifth week, *Science Feedback* reads and responds to listener letters to the BBC Science Unit.

On the Americas/Europe stream, listen in Mondays at 0930 (only on frequencies targeted to the Americas), repeated Tuesdays at 1730 and Wednesdays at 1230. Via the Africa stream, *Science Extra* is heard Sundays at 1501, repeated Mondays at 0730. The Asia stream has this rotation on Sundays at 1501 (only on frequencies targeted to East Asia), repeated on Wednesdays at 0345 and 2345, and on Thursdays at 1515 (only on frequencies targeted to South Asia).

Science View is a five minute program in which members of the BBC's Science Unit take turns providing a personal commentary on complex science issues and their implications. *Science View* is offered via the Americas/Europe stream Sundays at 2305, repeated Fridays at 0455; and via the Asia stream Wednesdays at 1555 only on frequencies targeting East Asia.

The BBC also offers two unique series of programs on science and technology specifically for young people. *Pop Science* includes science information vignettes interspersed with pop and rock music. *The Lab* is a new magazine-style program that addresses itself to currently evolving topics, as well as to answering questions submitted by its young audience. Each program generally has a run

of six to ten weeks in rotation with other series on other topics also intended for teenage audiences.

While precise information on just when these science series would be running was not available at deadline for

STAR CHARTS

this article, they are likely to run periodically in these half-hour slots: on the Americas/Europe stream at 1930 Wednesdays, repeated Mondays at 1430 and Tuesdays at 0730; on the Africa stream Mondays at 0230, repeated at 1430; and via the Asia stream Mondays at 0730, repeated Thursdays at 1615.

■ Deutsche Welle

One would expect that a station representing a nation renowned for its engineering prowess would have prominent programs on scientific and technological topics. And DW does!

DW packages a series of four programs which run in rotation in a weekly slot reserved for science entitled *What's New*. The first week of the month is reserved for *Headcrash*, which is devoted to computer news. The second week features a program on the latest developments called *Science and Technology*. *MediaMag*, on communications, is heard during the third week of the month. And during the fourth week, *Made in Germany* looks at new German products and innovations. Listen in Mondays at about 0230, 0930, 2130 and 2330 or Thursdays at about 0130, 0330 and 0530.

■ HCJB

El Mundo Futuro is Spanish for The Future World and this program takes a wide angle view of science, technology and the future. The program airs Tuesdays at 0830, 0930 and 1930; Wednesdays at 0130 and 0430.

■ Radio Australia

Innovations highlights inventions and new practices and airs Sundays at 0130, Mondays at 0130 and 1030, Tuesdays at 2130.

Ockham's Razor presents pointed commentaries on scientific issues. Tune in Sundays at 0605, Thursdays at 1530 and Fridays at 0205.

Science File is a magazine style program on science, medicine and technology. It is broadcast Sundays at 0730, Wednesdays at 0130 and 1030, Thursdays at 2130 and Satur-

days at 0330.

The Science Show is an omnibus program looking at global scientific developments. It airs Tuesdays at 0010 and Saturdays at 0905.

■ Radio Canada International

Arguably the finest program on shortwave about science is the CBC's *Quirks and Quarks*. The program and its presenters have a unique and uncanny ability to take complex scientific topics and issues and make them accessible and understandable to just about anyone. *Quirks and Quarks* presents what's new and next in science and airs Saturdays at 2308* and Sundays at 1208* on RCI. CBC North Quebec on 9625 kHz (and the CBC Radio One domestic network) airs the program at 1608* on Saturdays.

■ Radio France Internationale

Discovery is a weekly look at scientific news from France and around the world airing Tuesdays at approximately 1237 and 1437, Wednesdays at around 1725, and Thursdays at approximately 1640.

■ Radio Habana Cuba

Breakthrough is this Cuban station's brief weekly science report. It is broadcast Sundays after the 2300 news and Mondays after the 0230, 0430 and 0630 news.

■ Radio Netherlands

The Research File is a perennial award-winning program that has covered a variety of scientific fields, topics, and issues for over a decade. This excellent program is always timely with an accessible presentation style that gives the listener a clear understanding of often complex matters and how they matter to his and her everyday world. *The Research File* airs Mondays at 0753, 0953, 1153*, 1353, 1753, and 1953; Tuesdays at 0053, 0253, and 0453. It is repeated on Thursdays at 0853, 1053, 1453, 1853, and 2353; Fridays at 0153.

■ Radio Romania International

Romanian scientific research is the focus of *Romanian Scientists*, a weekly report broadcast Wednesdays at about 0710, 1455, 1925, and 2125; Thursdays at about 0225, 0425, 1255, and 2325.

■ Radio Singapore International

Frontiers looks at local and global developments in health, science, education, and the environment on Sundays at 1215, repeated Wednesdays at 1240.

■ Radio Sweden

Horizon is a monthly report on science in Sweden and Scandinavia that airs on the fourth Thursday of the month at 1145*, 1245*, 1345*, 1745, 1945*, and 2145*, and on the fourth Friday of the month at 0145, 0245, and 0345.

■ Voice of America

Science in the News is a program broadcast in "special English" that gives a weekly report on the latest developments in science. It is broadcast Tuesdays at 0040 to the Americas and East Asia, at 1340 to East Asia, at 1540 to South and East Asia and the Middle East, at 1610 to Africa, and at 1840 to the Middle East.

New Horizons is a weekly survey of science, medicine, and technology. It goes out on Saturdays to the Middle East and East Asia at 1910, and on Sundays to East Asia at 1110, to South and East Asia and the Middle East at 1510, to the Middle East and Africa at 2110.

■ Voice of Russia

Science and Engineering is a long standing program that goes back to the days of Radio Moscow and the Soviet Union. Today the program highlights the latest scientific and technological developments in Russia and the Commonwealth of Independent States. It is a weekly program that has multiple airings throughout the week. You can tune in to *Science and Engineering* on Sundays at 0511*, 1311* and 2111*; Mondays at 0611*, 1011* and 2132*; Tuesdays at 1611*; Wednesdays at 0211* and 1611*; Thursdays at 0911* and 1911*; Fridays at 0611* and 2132*; and Saturdays at 0611*.

John Figliozzi is editor of *The Worldwide Shortwave Listening Guide*



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Uniden BC895XLT TrunkTracker A First Look

By Bob Grove

This has been a banner year for the scanner hobby; initially faced with restrictive listening legislation, the industry has rallied, revealing some innovative and long awaited products. Two from Uniden, the BC235XLT handheld and now the BC895XLT base/mobile scanner, lead the pack.

Uniden's two new TrunkTrackers have taken the scanner market by storm, with the handheld already being sold in record numbers, and the base/mobile version steeply back-ordered at this writing.

But a sneak preview of the BC895XLT reveals a radio remarkably similar in appearance and operation to the popular BC890XLT and BC9000XLT, but with one outstanding advantage: It automatically tracks Motorola's 800 MHz trunking system, which has long eluded scanner listeners.

The trunk tracking program is identical to that of the BC235XLT; anyone familiar with that operation can use the trunking features of the 895 without even looking at the manual.

The 895 comes with a giant, 60 page, extensively illustrated manual, the largest ever published for a Bearcat scanner. It is easy to follow and faults in the manual are minor: The specifications say that the 895 has seven pre-programmed search ranges, but it doesn't (except for weather); and that it can be powered from an internal battery, but it can't (it can be powered by an optional 12 VDC cigarette lighter adaptor or from the 120 VAC wall adaptor supplied).

Apparently the errors came from copying the specs of the BC235XLT handheld. In spite of these typographical gaffes, the radio has an array of useful features.

The weather alert can be a valuable ally during storm season. When the emergency signal is activated by the National Weather Service and the scanner is tuned to the

appropriate NOAA broadcast frequency, a loud siren—independent of the volume control setting—is certain to be heard anywhere near the room!

The 895 is a triple conversion design, offering the typical Bearcat tuning ranges—and then some: 29-54, 108-174, 216-512, and 806-956 MHz (less cellular). 300 channels of memory may be assigned to 10 banks of 30 channels each. Ten separate priority channels may be assigned, one to each bank.

Channels may be individually locked out, or delayed by 2 seconds after signal dropout. An autostore feature allows search-discovered frequencies to be automatically memorized for later recall. Frequencies may be scanned or searched at 100-300 steps per second.

Frequencies may be direct-entered by the keypad, or sequentially accessed by a rotary dial. Tuning steps are factory-defaulted as appropriate for the frequencies chosen, but may be manually selected for 5, 12.5, or 25 kHz.

The detent positions of the small tuning dial are a little stiff, making single-finger spinning of the dimpled knob somewhat touchy. It is useful, however, for rapid slewing across a band of frequencies.

A five-segment, vertical, LCD bargraph is used as a relative signal strength indicator, and it does have an excellent dynamic range. But in our test, the most powerful local signal (S9+30 dB on an ICOM R7100) only illuminated four segments. The fifth segment apparently requires a real crusher of a signal!

Adjacent channel selectivity and weak-signal sensitivity were roughly equivalent to the well-respected ICOM, and it has good dynamic range as well, making the 895 resistant to overload problems like intermodulation ("intermod") in high sig-



nal areas.

A data skip feature may be selected allowing the scanner to automatically resume its scan/search function within 2-3 seconds if it stops on a channel with digital noise rather than voice communications.

The powerful 1.8 watt audio amplifier delivers substantial sound to the internal speaker, or to an accessory external speaker for noisy environments. A pair of line-out and remote jacks allows automatic activation of a similarly equipped tape recorder, and the user may select which memory channels will activate the recorder.

Subaudible tone squelch (CTCSS or "PL") is built in, allowing the listener the option of homing in on particular groupings of users within an agency using this common feature.

The new scanner is also fitted with an RS232 port for computer control. No support is offered by Uniden, so this feature awaits development by aftermarket entrepreneurs. One of these companies has managed to get its promotional literature packaged with the 895.

But the real beauty of the new BC895XLT is its ability to seamlessly follow Motorola trunked radio systems, a rapidly expanding technology which has eluded lesser scanners for years.

MT's scanner equipment columnist, Bob Parnass, will take an in-depth look at performance specs and trunk tracking features of the BC895XLT in an upcoming issue.

WHAT'S NEW?

PRODUCTS AND BOOKS OF INTEREST

Receivers Plus

A number of receivers, already top picks, are "spiffing up" with new features and additions in time for the holidays.

PLUS PERFORMANCE

AOR's high performance AR7030 is now the **AR7030 "Plus"** with the addition of three new features. An internal board (option NB7030) provides a noise blanker to screen out interference such as ignition noise, and works in both AM and SSB modes; an audio notch filter can remove annoying whistles in any mode, and will even follow a tone while tuning in SSB. In addition, a replacement CPU is included which provides 400 memory channels, each capable of retaining a 14 character alphanumeric text comment, and timers which allow you to switch-on/off for unattended recording or as a wake-up call, etc..



Customers with the standard AR7030 receiver may contact AOR UK for retrograde information (email: info@aor.co.uk Web: <http://www.demon.co.uk/aor> fax: 01773-880780, phone +44-1773-880780). The CPU replacement can also be purchased separately. The AR7030 Plus is available from Grove Enterprises (\$1269.95) and other MT advertisers.

Another AOR product getting a "Plus" in performance is the wide-coverage **AR-5000 Plus 3**. Synchronous AM has been added to phase lock on your choice of double, lower, or upper sideband to reduce distortion and fading. When Automatic Frequency Control is selected, the receiver is

automatically tuned in to the center frequency for best signal strength—especially useful when searching the VHF/UHF bands. As with the AR7030 Plus a noise blanker provides added protection from impulse and vehicle noise. Last, but not least, you get double the memory sets—2000 memory channels, 40 search banks, 10 VFOs, etc.

The AR5000 Plus 3 is available from Grove for \$2095.95, and from other MT advertisers.

Not to be outdone, Drake has added improvements to its respected R8A World Band Communications Receiver. The upgraded model will be called the **R8B**; its added features include selectable sideband synchronous AM detector, 1000 programmable memories (up from 440), and increased scan speed. Drake says the R8A will be available while stock lasts at previous prices. The new R8B is selling for \$1159.95 from Grove Enterprises. 800-438-8155, email: order@grove.net Web: <http://www.grove.net/>

Icom Debuts Software Receiver

Icom enters the multi-media receiver market with its announcement of the IC-PCR1000 software controlled communication receiver. Icom recommends a Pentium 100 MHz or better PC running Windows 3.1 or Windows 95 for the computer side of the "receiver." The PCR1000 comes with receiver unit, RS-232C serial cable for connection to your PC, whip antenna, and AC adapter.

Icom makes the transition to "virtual radio" as easy as possible

by providing three different ways in which to view the screen: the "radio" screen is the simplest, providing frequency readout and preset buttons for stations; the "communications receiver" adds an S-meter level, keypad, and most of the controls one would find on a traditional communications receiver; the "component style" screen shows all available functions as a full-feature component stack.

The PCR1000 has a wide frequency coverage of 0.01 MHz to 1300 MHz (in the US, 0.01-823.999, 849.00-868.99, 894.00-1300.00 MHz). Modes are WFM, FM, AM, SSB, and CW. Tunable bandpass filters are used for VHF/UHF reception. A digital automatic frequency control circuit compensates for frequency drift in FM mode. Memory storage is, of course, limited only by your computer. In addition to frequency, memories can store mode, tuning step, and attenuator settings.

Other functions include: IF shift, voice scan control circuit, PLL circuit, S-meter squelch, selectable tuning steps, noise blanker, tone squelch, 20 dB RF attenuator, AGC function, external speaker level control.

Grove's price will be \$599.95. Call 800-438-8155 for information.

Opto Micro Counter

If a small, hands-free, no-fuss frequency counter is what you need for testing radios, whether in the shop or in the field, Optoelectronics' Micro Counter should fill the bill. Housed in a pager style case like their first Techttoyz product (the DTMF Decoder), the Micro Counter will slip onto a belt or into a pocket for easy portability.

The counter has a frequency range of 10MHz to 1.2GHz and can capture a 5 watt UHF signal

from as far away as 125 feet when used with the TMC100 rubber duck antenna. Three selectable gate times allow increased resolution of captured frequencies. Using an AA battery, the counter operates 10-12 hours.

Four modes of operation—Normal, Filter, Recall, and Digital Auto Capture—allow the user flexibility in using the counter. Only three internal memories are provided for logging captured frequencies, however.

The Techttoyz Micro Counter is \$99; the optional TMC100 antenna is \$9. To order, call Optoelectronics at 800-327-5912 or 954-771-2050, email sales@optoelectronics.com Web: www.optoelectronics.com



DXing at its Lowest

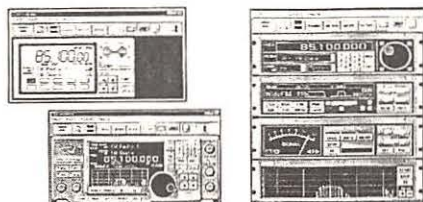
The National Radio Club has announced publication of the *Season of DXpeditions - Autumn 1996*. This 130 page book is a compilation of DXpeditions from around the world at the bottom of the sunspot cycle.

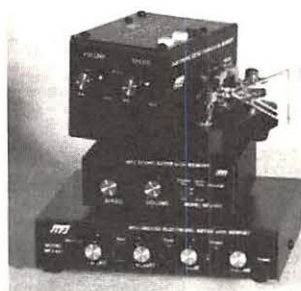
Compiled and edited by noted DXers Mark Connelley, Bruce Conti, and Chuck Hutton, the stories are bound to be both educational and entertaining, with tips to carry you into the better conditions to come.

If you're a member of the National Radio Club or the International Radio Club of America, the price is \$8.95; non member price is \$10.95, both post paid (Europe US\$ 15.95 Asia US\$ 17.95 via air mail). Please mention MT when you order from National Radio Club Publications Center, P.O. Box 164, Mannsville, NY 13661-0164.

CW Lives

Morse code is clearly not dead





at MFJ. The Mississippi-based manufacturer of radio gear has introduced three new SlimLine electronic keyers. According to Richard Stubbs, KC5NSZ, the new SlimLine keyers let you "generate perfect code with almost no effort at all." All you do is plug in one of MFJ's iambic paddles and squeeze — perfect code!

Here's what happens: If you press the "dot" paddle before a "dash" completes, MFJ's SmartDotDash will finish the dash, make a space, and then make the dot! It's so forgiving you can concentrate on enjoying your QSO and not on the critical timing needed to make perfect code.

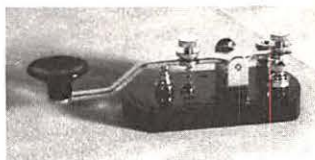
MFJ has also added an adjust-

ment so you can change the lengths of your dots and dashes to sound distinctive. Stubbs says that rare DX will easily pick you out of a pile up.

All SlimLine keyers have speaker, pitch, and volume controls for sidetone, and speed and weight controls. Speed is 2 to 65 words per minute. Pitch is 200 to 1000 Hz.

The MFJ-441 SlimLine keyer is just \$59.95. The MFJ-447 is \$79.95, and the '442 is \$144.95.

Too expensive? If you'd



rather send code without remedial help, or just want an inexpensive practice key, MFJ announces the MFJ-550 black and chrome antiqued straight key for a measly \$7.95! Send code the old-fashioned way at an old-

fashioned price!

For more information or to order, call MFJ at 800-647-1800 or write MFJ Enterprises, 300 Industrial Park Road, Starkville, MS 39759. Remember to mention MT.

White House at 35,000 ft.

One of the favorite fed — not to mention aero — monitoring targets is the presidential jet, Air Force One. There's been a lot written about it and some have even gotten a glimpse of this incredible aircraft as it sits at the airport during campaign stops. Few, however, get inside but the rich and the powerful.

If you've hunted the plane with your radio, you might be interested in a video called *Air Force One*. Hosted by actor Charlton Heston, the program takes a compartment-by-compartment look at today's Air

Force One, the SAM 27000. There are interviews with pilots, stewards, notable dignitaries, as well as former chief executives who flew the "White House in the sky."

This is a 90 minute program that can be your background briefing on monitoring target number one: Air Force One. You can get a copy for \$19.95 from Publisher's Choice Video, 37 Eleventh Ave., Huntington Station, NY 11746. Include \$3.00 postage and handling. Visa and Mastercard are accepted. Mention MT when you write.

Seattle Talkgroups

Bruce Miller has compiled a 28-page booklet designed to aid scanner listeners in the Seattle area who own a Uniden TrunkTracker scanner. Entries are sorted in two formats: by agency and by numeric ID—no hex conversions are necessary. Information includes Trunk

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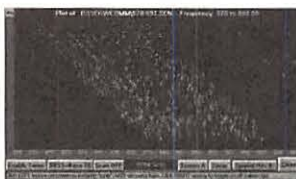
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Tracker ID, Hex ID, agency, talkgroup, and source of the information. Frequencies for the King County Regional 800 MHz system are provided in the back.



Talkgroup IDs/King County is available for \$9 from Bruce Miller, Box 31134, Seattle, WA 98103, bruce.miller@pobox.com, <http://www.eskimo.com/~bruce/tidking.htm>

Catalogs and Services

Andrew Corporation published

its full product catalog number 37 in printed and CD-ROM versions. The 784-page catalog is a reference tool for systems planners and product specifiers in the electronic communications industry. Telephone 800-255-1479 or visit <http://www.andrew.com>

Audio Classic, Ltd, in Walton, New York, buys, sells, trades, and repairs high end and vintage audio equipment. Call 607-865-7200, fax 607-865-7222, email info@audioclassics.com, Web: <http://www.audioclassics.com>

Old West Graphics' 1997-98 catalog is available with promotional sign and graphic design products for hams and amateur radio clubs—banners, graphic design services, decals, magnetic signs, mouse pads, photo ID name tags, and more. Write Old West Graphics, 490 N. St. Louis Avenue, Loveland, CO 80537-5878, or call 800-484-9492 ext. 8601, email: oldwest@verinet.com Web: <http://www.success-marketplace.com/shops/>

oldwest

RadioShack's 1998 catalog is now available at your local store with the usual array of radio products. But the catalog features an extensive line-up of products and services in cellular and PCS technology. You can even sign up for long distance and internet services. RadioShack—"America's Telephone Store."

Own a Slice of History

Children's Hospital of Pittsburgh sells a Lucite paperweight that contains a slice of the old tower that served KDKA for 58 years. When it was replaced in 1994, slices were made into 4,000 paperweights. At the end of August, there were 1,000 left.

To order, send \$23 to Children's Hospital of Pittsburgh, Development Dept., 3705 Fifth Avenue, Pittsburgh, PA 15213-2583. You might want to call 412-

692-5317 first to be sure there are some left. The paperweights have produced about \$46,000 for the children's hospital, according *Radio World*.

Books and equipment for announcement or review should be sent to

"What's New?" c/o Monitoring Times,

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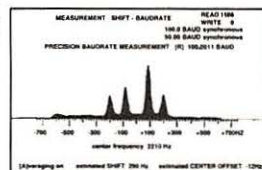
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- TDM342/ARQ-M24
- FEC-A FEC100A/FEC101
- FEC-S - FEC1000 Simplex
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Japan Radio's Affordable NRD-345

Japan Radio used to be for pros only. Go into any major drydock for oceangoing vessels, and you'd find facilities for Japan Radio's JRC receivers and transmitters. Sometimes JRC marine gear would outlast the ships themselves.

From this long history evolved the reputation of JRC products as bulletproof, and it showed in the price. A single professional grade receiver could cost many thousands of dollars, a bargain on ships where lives and millions of dollars were at stake.

■ Legendary rugged gear for general public

Eventually, Japan Radio started making receivers for the general public, the first being the NRD-505, which was almost as indestructible as JRC's marine hardware. This was followed by the legendary NRD-515, just as tough but with modern features relatively lacking on the '505. At *Passport to World Band Radio's* monitoring site alongside a torrid swamp in central South America, our '515 has survived tropical heat and humidity and one direct lightning strike, yet it continues to hum along as if it were fresh off the assembly line.

The NRD-525 was less impressive, but shortly thereafter the NRD-535 was released to wide acclaim, and continues to be sold today. Trouble is, in the preferred D version it goes for around \$1,700, and to perform to its full potential the '535 needs a Sherwood SE-3* accessory to produce quality audio and worthy synchronous detection. That brings the price up to a wallet-shredding two kilobucks. Considering you can get a Drake R8B for hundreds less, it's not hard to see why the '535 has not been a barn-burner.

■ Affordable, with superior ergonomics

Enter the new NRD-345. At \$799.95, it puts Japan Radio back into the horse race. Its footprint is a modest 9-3/4 x 4 x 9-1/2 inches, and it has the high level of build quality that listeners have come to expect from JRC gear. However, unlike most high-quality gear the 345 is powered by an outboard wall wart AC adaptor.

The '345's ergonomics are superior. To enter a frequency—say, 6175 kHz for the BBC World Service—press 6, 1, 7, 5, then the kHz button next to the keypad. Alternatively,



The '345 comes from a long line of thoroughbreds, and in many respects it shows.

you can think of the frequency as 6.175 MHz, and enter it as 6, (dot), 1, 7, 5, followed by the MHz key.

Storing information in a memory-channel preset is equally easy: Select the frequency, mode, and so forth that you want, then press the MW button, choose the memory preset you want to use, then press ENTER. Recalling a memory preset is similarly easy: Press MEMO, then use the arrow keys to pick the preset you want, or punch in the number of the preset, then push ENTER.

An indented horizontal line neatly cleaves the front panel's top half from the bottom. Smack in the middle is a first-rate, large, free-spinning tuning knob with a rubber-tire edge and speed dimple. There are also clock and timer buttons, a large headphone jack, controls for noise-blanker level and functions, and scanning controls, as well as up/down slewing buttons for frequency and mode changes. Added to that are buttons for memory-channel operation, writing to memory, bandwidth choice, VFO selection, attenuator, volume, AGC and more. The end result is a control panel that looks, feels, and performs seriously—more so than nearly any other non-JRC receiver.

On top of the cabinet is a small speaker, and there's a tilt bail to place the receiver at a comfortable operating angle. On the back panel are connectors for coax-fed and wire antennas with a switch for choosing between them, a port for computer control, a fax-out jack, a recording jack, a jack for an external speaker, and a connector for the external AC adaptor. There is also a one-amp removable fuse which, as we unintentionally discovered during testing, works exactly as it should. It provides a valuable added margin of receiver protection over the many wall wart receivers which rely entirely on their AC adaptors' built-in fuse as safeguard.

The '345 tunes the usual 100 kHz to 30 MHz longwave, mediumwave AM, and short-

wave spectra in the AM, synchronous-AM, lower-sideband, upper-sideband, and fax modes. Tuning is in 5 Hz increments, but this can be manually changed to 0.1, 1, and 10 kHz. It has two high-performance bandwidths, nominally 4 kHz and 2 kHz, and there's space for a third.

There are two VFOs, 100 presets that store—in addition to the frequency—the mode, AGC, attenuator, VFO, bandwidth, and noise-blanker settings. Features include a clock/timer, noise blanker, meter-band entry, two antenna inputs, RS-232C port, keypad in telephone format, analog signal-strength meter, illuminated yellow LCD, slow/fast/off AGC, and memory scanning. However, there is no tunable notch filter or passband tuning to help with serious DXing.

■ Generally worthy performance

The '345 comes from a long line of thoroughbreds, and in many respects it shows. Sensitivity is excellent-to-superb on shortwave and longwave frequencies, but sensitivity within the AM band is only fair. Image rejection is excellent, and first IF rejection is superb. The AGC performs reasonably well, and the receiver's frequency stability is rock-solid.

The 4 kHz bandwidth measures a bit narrower than the factory specification, and also has a good shape factor. The 2 kHz bandwidth is also close to spec—2.3 kHz—with an excellent shape factor. Audio quality is Japan Radio's traditional Achilles heel, except with its professional gear. The '345, which includes a tone control, is reasonably good in this regard, with distortion in the AM mode being good-to-excellent. In the AM-synchronous and single-sideband modes, distortion is even less.

Remember, though, this is an \$800 receiver with much invested in construction quality, so there are performance compromises. For example, dynamic range and third-order intercept points are poor at 5 kHz spacing, and synthesizer noise precludes a measurement at 20 kHz spacing. In places like Europe this can be a problem, but in North America, especially west of the East Coast, the '345 should be up to handling most strong-signal situations.

The synchronous detector is also below par. It is double-sideband only, so it can't be used for its main potential purpose, which is to

reduce adjacent-channel interference. Even at that, the synchronous detector is suboptimal in reducing selective fading distortion, the other virtue of synchronous detection.

■ Special version resolves most shortcomings

We tested the '345 with a Sherwood SE-3 device.* This not only completely resolves the difficulties with the synchronous detector, it also adds passband tuning. Sherwood offers a ready-to-go NRD-345 with SE-3—the so-called NRD-345SE—for \$1,195, but while this combo makes for an excellent receiver, it also puts it in the same price league with the new Drake R8B, which we will be testing in the months to come. Still, this improved version of the '345 has superior audio, albeit with an occasional minor AGC hiccup, and JRC's quality of construction makes it enough to tempt fastidious consumers.

Withal, the Japan Radio NRD-345 is the first model to provide serious competition to Drake's value-priced SW8 portatop. If it had been designed with better dynamic range, another bandwidth, and a serious synchronous detector, it would have been even more tempting.

This equipment review is performed independently by Lawrence Magne and his colleagues in accordance with the policies and procedures of International Broadcasting Services, Ltd. It is completely independent of the policies and procedures of Grove Enterprises, Inc., its advertisers and affiliated organizations.

* Sherwood Engineering, 1268 South Ogden Stret, Denver, CO 80210; 303-722-2257, fax 303-744-8876, email robert@sherweng.com Web <http://www.sherweng.com/>

The NRD-345 is available from Grove Enterprises for \$799.95; call 800-438-8155 for info.

RADIO DATABASE INTERNATIONAL WHITE PAPER® reports contain virtually everything found during exhaustive tests of premium shortwave receivers and outdoor antennas. For a complete list, please send a self-addressed stamped envelope to RDI White Papers, Box 300M, Penn's Park PA 18943 USA; or go to www.passport.com.

LETTERS, continued from pg. 4

guide in order to determine what's playing. Pity the listener in parts of Labrador who has to add two hours and 30 minutes to the CBC program guide or the listener in British Columbia who has to subtract four hours. The CBC doesn't seem to realize that its own country spans 6-1/2 time zones!

"Broadcasters who go the way of internet broadcasting should begin to realize that they no longer have just a local or regional audience. They need to allow for those computer listeners who are in different time zones by incorporating UTC into their program schedules."

Jim Frimmel, MT Program Manager

All Ozone is not created equal

We received excellent responses to John Winslow's provocative letter in the September issue regarding the production of ozone by lightning. Thanks to Stephen Kilpatrick, Joseph Sabutis, and Gregory Morrow for demonstrating why such partially-true theories only contribute to the confusion about the ozone-hole dilemma, and why ground-level ozone produced by lightning has no influence on ozone loss in the stratospheric

layer with which scientists are concerned.

Because the discussion is admittedly off-topic and difficult to summarize briefly, I have posted these comments on the issue on a new Web page devoted to your letters: www.grove.net/mtletters.html — Watch this site at the first of each month for letters, discussions, and opinions for which there isn't room in the magazine! You are invited to add your two cents to it, or to start a new discussion topic. Here's your chance to "talk" to each other.

Don't want to wait for the editor to post new contributions? Would you be interested in an MT subscribers email list server? Topics appropriate to such a list might be the state of the hobby in general, responses to articles appearing in MT, and other topics that don't fall within the sphere of existing email hobby groups. Let me know your thoughts at mteditor@grove.net

Happy thanksgiving and good listening to all our friends of radio!

Rachel Baughn, editor



Receiver Multicouplers — 100 KHz to 1000 MHz

Are you using several HF radios or VHF/UHF scanners at your monitoring site??
....consider including a multicoupler.

Both our **Passive** and **Active Multicouplers** are commercial grade specially designed for **demanding monitoring** applications with multiple radios. Our **2 and 4 port couplers** are 50 ohms units with better than **24 dB of port-to-port isolation**. Active couplers features wide-band **Low-Noise** distribution amplifiers with **High-Pass/Low-Pass** filtered inputs, BNC connectors standard.

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MC102:	2-PORTS/BNC 100KHz to 50MHz	\$72.00
MC104:	4-PORTS/BNC 100KHz to 50MHz	\$92.00
MC202:	2-PORTS/BNC 20MHz to 1GHz	\$72.00
MC204:	4-PORTS/BNC 20MHz to 1GHz	\$92.00

Active Couplers

MCA102:	2-PORTS/BNC 100KHz to 50MHz	\$135.00
MCA104:	4-PORTS/BNC 100KHz to 50MHz	\$155.00
MCA202:	2-PORTS/BNC 50MHz to 1GHz	\$135.00
MCA204:	4-PORTS/BNC 50MHz to 1GHz	\$155.00



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Sporty's JD-100 Air-Scan Portable Scanner

If you're not a pilot, you may not know about Sporty's Pilot Shop. The Batavia, Ohio, firm sells all manner of gadgets, charts, and books to aviation enthusiasts through a colorful mail order catalog. We hadn't heard of Sporty's until *MT* reader Doug Findlay alerted us to the new JD-100 scanner. Then we borrowed a JD-100 (S/N A03636) for evaluation.

If there's a single adjective which characterizes the \$150 JD-100, it's "utilitarian." It incorporates most of the features a pilot would want and nothing more. Frequency coverage is limited to 118 - 142.975 and 220 - 399.975 MHz in 25 kHz steps. An AM-only detector and narrow frequency coverage rule out reception of short range airline ground, baggage, and security operations which are fun to monitor at larger airports.

■ Features

Computer pundits proclaim this the year of "cheap memory," but the JD-100 provides only 20 channels and one VFO. The memories may be scanned at 10 channels/sec. in the conventional manner with a fixed 2-second rescan delay. Channels can be erased (cleared), though there is no channel lockout facility so all programmed channels are scanned. Channel 0 is a priority channel, which is always sampled at 2-second intervals during memory scan. The only way to disable priority scan is to erase channel 0.

There is no limit search. Instead, one can search up or down at 20 steps/sec. after pressing the appropriate key in the VFO mode.

■ Mechanics

The JD-100 is powered by four alkaline AA batteries or by an optional 9 VDC wall wart. The manual makes no mention of using rechargeable NiCd cells. Our JD-100's low battery indicator activates when voltage falls to 4.1 VDC, making NiCd operation feasible. Current drain measurements show the JD-100 requires a thrifty 63 ma. while scanning. A milliammeter connected between the JD-100 and power supply reveals the action of a battery saver circuit, which reduces current drain in manual mode during periods of inactivity.



The JD-100 is furnished with an 8-inch rubber covered helical antenna fitted with BNC connector. Metal belt clip, nylon carry case, 12V/24V cigarette lighter power adapter, and AC power supply are extra cost options. Sporty's Pilot Shop sells base, mobile, and aircraft antennas as well.

Sporty's catalog mentions that the JD-100 is made by JAL Data, a division of Japan Airlines. The printed circuit boards in our JD-100 are labeled with a GE-prefixed identifier, reminiscent of GRE-manufactured scanners.

Our lab equipment can detect 10.7 and 0.455 MHz IFs. There may be a higher first IF, too, which would explain the good rejection to VHF signals 21.4 MHz away from the display frequency.

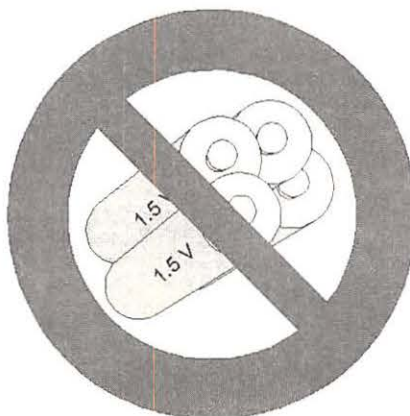
■ Performance

Our JD-100's audio is crisp and above average in quantity. We hear a few birdies which beat with AM stations, producing high pitched whistles on the affected frequencies. Intermodulation interference has not been a problem, though we weren't able to take the JD-100 close to high power base transmitters.

On the test bench, our JD-100's sensitivity was almost constant across the VHF band, but varied considerably in the almost 200 MHz wide UHF military air band. It's difficult for affordable scanners to attain uniform sensitivity across such a wide spectrum. The sensitivity measurements we make don't take into account the antenna, which has its own frequency response curve and can either compensate for or exacerbate variations in receiver sensitivity.

A 7-digit display shows frequencies out to only two decimal places, so a frequency such as 300.275 MHz is displayed as 300.27. The LCD's fair contrast is offset by the use of very large digits for frequency and channel number. Green LEDs provide excellent backlighting for 5 seconds after the lamp key is pressed. The keys are translucent but are not backlit, like the keys of the JD-200, Sporty's walkie-talkie model.

There is no keyboard confirmation tone, and we must often press numeric keys more than once for the strokes to register. A top



COLLECTOR'S CORNER



Sonar FR-105

mounted key lock pushbutton inhibits keypad operation except for the lamp key.

The top mounted, soft rubber squelch and volume control knobs are easy to grasp and cushion the control shafts from trauma better than hard plastic knobs.

MEASUREMENTS

SPORTY'S JD-100 AIRCRAFT SCANNER

S/N A03636

Frequency coverage (MHz):
118 - 142.975 (AM, 25 kHz steps)
220 - 399.975 (AM, 12.5 kHz steps)
Sensitivity: see graphs
Image rejection due to 10.7 MHz IF:
42 dB @ 120 MHz
Practical memory scan speed: 10 ch/sec.
Search speed: 20 steps/sec.
Current consumption at 6 VDC:
off - less than 25 uA
scan - 63 mA
full volume - 150 mA
Battery saver: activates after 10 seconds in Manual mode.
Low battery warning at 4.1 VDC.
Auto power off at 3.0 VDC
Intermediate Frequencies:
10.7, 0.455 MHz

Final Thoughts

The JD-100 provides basic features and is dedicated to hearing aircraft communications. It is better suited to pilots than scanner hobbyists who enjoy monitoring ground, baggage, shuttle bus, and security FM operations at larger airports.

Sporty's warranty is impressive. Unless the JD-100 is abused or suffers battery leakage damage, it is covered for 5 years.

For more information, contact Sporty's Pilot Shop at 1-800-LIFTOFF. On the World Wide Web, check out <http://www.sportys->

catalogs.com/pilot/pilot.html.

PRO-62 Tip

William Matthew Beachy asked for a way of defeating the Radio Shack PRO-62's battery saver feature, which keeps most of the radio's circuit off until a signal is received. William finds the battery save action clips the first word of too many transmissions.

The PRO-62's battery save feature is active only while in Manual mode. To defeat it, set the PRO-62 to the desired memory channel, then press the Program key.

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Tracking the Huntsville Trunks

In August I had the pleasure of attending and working the Grove booth at the Huntsville, Alabama, Hamfest. After my first trip to this gathering I am convinced it's one of the finest hamfests in the country. I have never met a nicer bunch of folks than the hams who organize this event. I also met quite a few of the local law enforcement/fire and rescue services personnel, and enjoyed exchanging information on their portion of the Huntsville 800 MHz system.

As an added benefit, I got to do some Trunk Tracking on the city's Motorola system with a BC-235XLT. I also received an extensive profile on the system from an anonymous friend. So, for our friends in the Huntsville area, this month's column is devoted to you and your 800 MHz public safety trunking system.

City of Huntsville, Alabama

The city of Huntsville has a two site simulcast Motorola Hybrid SmartNET system. It utilizes the same 10 channel pairs at both sites. Police and fire units use MTS-2000 48 mode handheld radios. During our visit DES was noted in use and it has been confirmed that certain police units have the DES voice encryption capability. Vehicle radios are the Spectra C7 units.

EMA and MIS subfleets use MTX-8000 handheld radios. Non-priority services use the STX type-1 handheld radios and MaxTrac 800 vehicle radios.

I used a user-defined fleet map while I was in Huntsville of: S10,S0,S0,S0,S0,S0,S0

This seemed to work, but local Trunk Tracker owners should confirm if type 1 agencies are tracked properly.

Trunk System Frequencies

854.0125 854.0625 854.9625 855.2125
855.2375 855.7125 856.2375* 859.7125*
860.7125* 860.9375*

System Type: Hybrid

National Mutual Aid Frequencies (conventional)

866.0125 Hailing repeater (standard offset,
156.7 Hz tone)
866.5625 Working repeater (standard offset,
156.7 Hz tone)

* denotes frequencies that are used as control channels. One is used each day and the change is made at midnight.

Police Talk Groups

16 Citywide-1 (All city departments)
32 Citywide-2 (All city departments)
48 Dispatch-1 (North): Baker/Charlie/
Tango units
80 Dispatch-2 (South): Delta units
112 Dispatch-3 (West)
144 Records
176 Jail
208 Admin-1/Special Ops Division (K-9/
SR/OCU)

240 Admin-2
272 Common (all police)
304 Warrants
336 Academy
368 DARE
400 Training
464 SR-1 (SWAT)
496 SR-2 (SWAT)
528 SR-3 (SWAT)
560 SR-4 (SWAT)
592 OCU (Vice/Narcotics)
624 OCU Tac
688 CID Common (Criminal Investigation
Division)
720 CID Property (Theft/Burglary)
752 CID Persons (Rape/Robbery/Homicide)
784 CID Supervisor
816 Uniform Patrol
848 Patrol Tac-1
880 Patrol Tac-2
912 Patrol Supervisor
944 Internal Affairs Division (IAD)
976 Task Force (DUI/traffic enforcement)
1008 K-9 Tac
1040 Safety Patrol (Crossing Guards)
1104 Fleetwide
3856 Housing (Public Housing Patrols)

Fire Talk Groups

1616 Fire Dispatch
1648 Fire Prevention
1680 Fire Suppression
1712 Fire Tac-1
1744 Fire Tac-2
1776 Fire Tac-3
1808 Fire Tac-4
1840 Fire Tac-5
1872 Fire Tac-6
1904 Fire Tac-7
1936 Fire Tac-8
1968 Fire Tac-9
2000 Fire Tac-10
2032 Fire Training
2064 Fire Drill-1
2096 Fire Drill-2
2128 Admin
2160 Fire Tac-11
2192 Fire Tac-12
2224 Fire Tac-13
2256 Fire Tac-14
2288 Fire Tac-15
2320 Fire Tac-16
2352 Fire Tac-17
2384 Fire Tac-18
2416 Fire Tac-19
2448 Fire Tac-20
2480 Fire Supply
2512 Fire Communications
2544 Fleetwide
2832 Moscad Data (opens baydoors/turns
station lights on at time of pageout)
2864 Moscad Voice (gives voice info to
station at time of pageout)

EMA Talkgroups

3248 Admin (EMA Staff)
3280 EMA-1 (EMA Staff/County Fire

Marshall)
3312 EMA-2 (EMA Staff/County Fire
Marshall/ALDOT)
3344 EMA-3
3376 EMA-4
3408 EMA-5
3440 EMA-EOC (Emergency Operations
Center)
3472 EMA-Ops (Emergency Operations
Tactical)
3504 EMA Group 1
3536 EMA Group 2
3568 EMA Group 3
3600 EMA Group 4
3632 PA/Siren (Weather Siren activation/
public address)
3664 Fleetwide

Miscellaneous Talkgroup

2896 Department that manages all city
telecom systems

Other Services, Type 1 Fleets

300-01 Inspection
300-04 Traffic Engineering
300-07 Parking Admin
300-09 Parking Enforcement
300-11 Buses
300-13 Handi-Vans
400-01 Public Works Admin
400-03 Streets
400-05 Sanitation
400-07 Drains
400-09 Pollution
400-11 Sewers
400-13 TVI
500-01 Fleet Maintenance
500-03 Facilities
500-05 Landscape-1
500-06 Landscape-2
500-07 Landscape-3
500-09 Recreation
500-13 Engineering
700-01 Clerk
700-04 Court
701-01 Health
702-01 Natural Resource
702-04 Risk Management
704-01 Animal Control
705-01 Community Development

We thank our anonymous contributors in Huntsville for their assistance in putting together this *Tracking the Trunks* system profile.

You can join the Grove Trunkcom discussion newsgroup on the Internet by sending an e-mail message to majordomo@grove.net. In the body of the text type:

subscribe trunkcom
end

And that does it for this month. If you have system information that we can profile in this column, you can send your information to: tracker@grove.net or *Tracking the Trunks*, P.O. Box 98, Brasstown, NC 28902.

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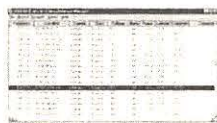
The recent addition of our SpectrumScope to the increasing number of WiNRADiO features has opened a new door of possibilities, never available in the scanner world before. Our patented Visitune™ feature is one of them. Called "the ultimate scanning sensation" by one of our beta testers, Visitune™ brings a totally new experience to scanning. Imagine dragging your mouse across a scanned spectrum; click on a peak and you are tuned - then hold the mouse button down and keep dragging the frequency cursor. The receiver will tune continuously, smoothly following your hand movements, with the frequency spectrum visible in the background. You can also make the spectrum display update behind your cursor as you sweep. And, if you ever wondered why we made it possible to use more than one WiNRADiO in a single PC - now you will know; the background spectrum can show the situation on a band in real time while you are exploring the frequencies with your second receiver!



The WiNRADiO card: plug it in and transform your PC.



The WiNRADiO software: enjoy the virtual control panel.



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WiNRADiO Advantages

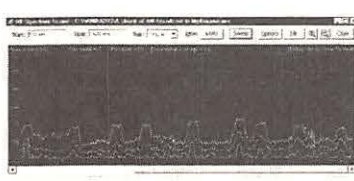
- WiNRADiO front-panel functions are more flexible and powerful than those of a traditional radio.
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Antenna Routing Panel for Rapid Switching

Different antennas which cover the same band often yield a desired signal at different strengths. This is particularly true if the antennas are of different design, or separated by a considerable distance, or are of different polarities (oriented vertically, horizontally, etc). The ability to switch quickly from one antenna to another is often helpful in determining just which of your antennas will give you the best reception at a particular time.

This is useful, for example, when fading occurs. When changing bands we also may want to change antennas. In any case, it is often convenient to be able to instantly switch between our various antennas rather than taking the time to unscrew one antenna connector, and then screw on another. One answer to rapid antenna switching is known as a "routing panel."

In my December 1994 column I described an HF antenna-routing panel for rapid switching between antennas in re-

ceive-only applications. This month we cover an HF antenna-routing panel which can be used for receive and/or transmit applications. I use such a routing panel in my ham shack, and I wouldn't be without one — It's that useful.

My friend Lee St. Clair, W7AX, has a number of transmitter-receiver and transceiver operating positions at his home. To switch between his various operating positions he uses an antenna routing panel somewhat similar to the one described below. Because it controls the route of RF emissions from his transmitters he calls it his "Emission Control Center." Lee finds the panel vital to the efficient operation of his multi-position station.

How They Work

Building an HF routing panel can be as simple as mounting a multi-position coax switch on a panel. Connect your antenna feedlines to the switch's multiple-position

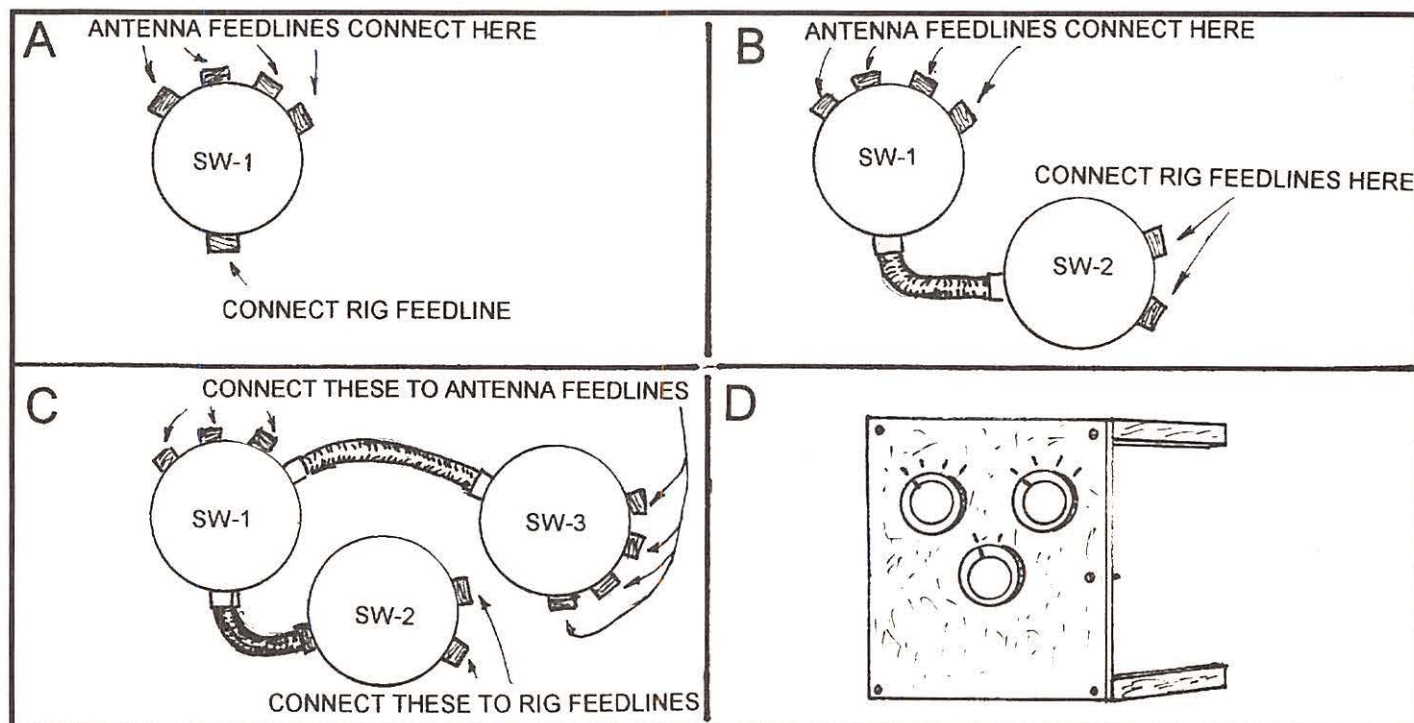
connectors, and a coax feedline from the switch's common terminal to the antenna input connector of your rig (fig. 1A). This allows instant switching between antennas.

If you want to be able to switch the routing panel's output between different rigs (receivers, transmitters, or transceivers) then a second switch can be added to the panel (fig. 1B). For installations with more antennas than can be accommodated by one coax switch we can add a third coax switch (fig. 1C). Connect the common position of that third switch to one of the inputs of SW 1, and leave SW 1 set to the position of that input when using antennas connected to SW 3.

Want a Little Excitement?

Some more daring souls include an extra position on SW-2 and connect a neon bulb between that position's connector and the ground connection. Leaving the switch in this position as a storm approaches allows

FIG. 1. A simple one-switch antenna-routing panel (A), a circuit which can route between antennas, and between rigs (B), a circuit which can handle more antennas than that of A or B (C), and a completed routing panel.



you to see very convincing proof of the fact that even distant lightning bolts can induce significant voltage into your antenna. The neon bulb flashes intermittently as lightning bolts occur in the approaching storm.

Do not do this if the storm is at all near your location. Disconnect the feedlines to your rigs if you do this. Never touch these switches, any outside antenna, or anything connected to an outside antenna when a storm is anywhere near your location. Lightning is faster than you are, and it's deadly.

■ Let's Build One!

Parts needed to build the complete system are listed below. For the systems in fig. 1A or 1B just omit the switches you will not need. Be sure to get switches with connectors that match the connectors on your feedlines.

Some switches automatically ground all their positions except for the position currently selected. This kind of switch is desirable for its safe routing-to-ground of lightning-induced electrical pulses. Nevertheless, even a very near-miss lightning strike may destroy the switches, and any circuit connected to them. For this reason, even if using automatic-grounding type switches, I disconnect the feedlines from the switch to my rigs when I am not operating.

1. SW-1. multi-position coax switch
2. SW-2. 2-position coax switch
3. SW-3. multi-position coax switch
4. The necessary short feedlines for connecting between the coax switches. Take care in making these. Make them short, but don't make them so short that when bending them you risk making their coax center conductor migrate through the inner insulation and possibly short on the outer conductor.
5. A panel about 1/8 in. or less thick. This can be masonite, aluminum or other appropriate, easily-worked material.
6. Knobs for the switches.
7. Position indicator plates for the switches, or you can just put numbers on the panel to show the location of the switch positions.
8. A panel-ground connector. This can be simply a bolt, two washers and nut bolted to the panel with the grounding wires between the washers. Add two more washers and another nut for holding the lead which comes from the earth-ground. Earth-ground can be

a ground rod.

9. Add whatever lightning-induced damage protection you wish. Mine is simply never operating in stormy weather, and disconnecting and grounding the antenna when it is not in use.

■ Steps in Construction:

1. To determine the size and shape of panel needed lay out the ground connector and the switches with their connecting cables attached
2. Mark and drill the panel.
3. Remove the cables.
4. Attach the switches to the panel.
5. Attach the ground connector.
6. Connect a heavy wire from each switch's case to the ground connection.
7. Re-attach the cables.
8. The panel can now be mounted in a cabinet for use on your operating desk, or in a box on the wall near your desk. You can forget the box and use brackets to mount the panel to the wall (fig. 1D). I prefer brackets because they allow easy access to changing feedlines. If you use a cabinet or box be sure to leave openings for the feedlines.
9. Attach your antenna's feedlines to the panel's connectors, and feedlines from the panel connectors to rigs as shown in fig. 1.
10. Set the switches for the desired rig and antenna, and you are "on the air!"

If coax switches cost more than you want to invest in a routing panel, and you want your panel for receive-only HF applications, then check out my December 1994 "Antenna Topics" column. That routing panel can be constructed with ordinary toggle switches. (Reprints can be ordered from *Monitoring Times* for \$3 plus SASE. Be sure to give the column, month, and year desired.)

■ Last Month:

I asked "What, if any, is the difference between a broadband antenna, and a "multiband antenna? Can an antenna be both broadband and multiband?"

Well, a multiband antenna covers more than one band, and a broadband antenna has a wide bandwidth (operating range) for the band or bands which it covers. Some antennas do have both these qualities. So, yes, an

antenna can be both multiband and broadband. Perhaps the extreme example of this would be some of the log-periodic arrays which cover several different HF bands, and all the spectrum in between those bands. They cover multiple bands because of their extremely large bandwidth.

■ This Month:

The routing panels discussed above depend on a radio operator to switch between antennas. There is a technology which is used to design devices which automatically switch between antennas as fading occurs. The idea here is that the antenna with the strongest signal is automatically selected, and connected to the system's receiver. What is the technology which provides these designs?

You'll find an answer for this month's riddle, and much more, in next month's issue of *Monitoring Times*. Til then Peace, DX, and 73.

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Q. *The death of Princess Diana was announced on the BBC by interrupting a symphony, then returning to the program, but with the substitution of Fantasia on Greensleeves by Raiph Vaughn Williams. Why did the BBC choose this piece? Is this how someone's passing is announced on shortwave? (Russ Conte)*

A. There is no such shortwave tradition, but I personally agree with the choice. The origin of the beautiful *Greensleeves* melody is lost to historical obscurity, but is occasionally accredited to Henry VIII. Henry was quite a musician, and another beautiful tune, *None-such*, may also have been written by him.

My guess is that the program director, faced with the dilemma of coming back with the remains of a symphony which had already been cut short, wisely substituted a British tune which strikes a uniformly resonant chord in virtually all who hear it, one of lyrical tenderness and pastoral beauty, a characteristic most of the world saw in Diana.

Q. *I recently heard Spanish language on 1490 kHz from my home in Arizona; where was it likely*

coming from? Does KAFF (930 kHz) in Flagstaff have an FM affiliate? (Bob Brock, Phoenix, AZ)

A. The Spanish language broadcast was likely coming from the U.S. There are thousands of low-power broadcasters on this "graveyard" channel serving local audiences and, in your region, Hispanic programming would be a good bet. Yes, KAFF has an FM operation on 92.9 MHz as shown in *M Street Directory* and in the Grove FCC database, both available from Grove Enterprises.

Q. *Do those electronic (ultrasonic) "pest repellers" really get rid of insects and rodents? Do they cause radio interference? Are they safe for cats and dogs? (David Kraft, St. Paul, MN)*

A. Good questions! I've never used one, and I've heard conflicting reports on their efficacy and side effects. Much of the literature is anecdotal; intense ultrasonic fields have been blamed for nausea, headaches, disorientation, and other complaints.

They shouldn't cause radio interference (at least for any distance) since they are acoustic, not electromagnetic, devices. I believe their

operating range is at least 40 kHz, so they are well above the roughly 20 kHz limit for humans, but pets have higher frequency sensitivity, so I'd be very careful in that respect. If you plug one into a wall outlet and the cat jumps, unplug it (or get rid of the cat).

How about it, readers? What experience have you had with these ultrasonic repellers?

Q. *In the July issue of MT, there was a mention in the AREA 51 article of a government contractor "EG&G." What do these initials stand for? (Kenneth Pearson, Freehold, NJ)*

A. They are the initials of the founders: Edgerton, Germeshausen, and Grier.

Q. *How can I add a programmable on/off clock to my scanner? (Terrynce Ondola, Norwood, OH)*

A. You can't—at least not internally. Clocks are a function of the microprocessor chip, and once it's factory programmed, there is nothing you can do to alter it. But there's good news, too. Since most scanners switch on in the scan mode, all you need is an inexpensive AC clock timer from a discount chain or

Bob's Tip of the Month

MT reader Tom Tompkins discovered a simple modification of a low cost Radio Shack product to make a very handy, compact, mobile extension speaker for his scanners, shortwave portable, and other small radios.

Tom discovered that the Radio Shack "pillow speakers," models 33-206 and 33-208, can be pried apart, speaker tempo-

rarily removed, and holes drilled in a grill pattern over the face to allow sound to be directed toward the listener.

Tom then reassembled and reglued the housing and speaker, attached Velcro to the back, and mounted the speaker(s) just above the vehicle door. The wires were run under the edge of the plastic moulding strips around the windshield to the radio(s)

A Handy Mobile Extension Speaker For Your Radio Gear

Editor's note: The Radio Shack 20-009 lapel speaker can be used as a tiny extension speaker without modification. Equipped with a 1/8" miniplug on the end of a coil cord, the lapel speaker can be clipped near the ear on a seat harness for concentrated monitoring in a noisy mobile environment, or for private listening in a car full of passengers....Bob

Radio Shack. Set the pins for the on/off time you want, and that's it!

Q. Reception of AM and FM broadcast stations in our new stucco/wire mesh construction townhouse is very poor. Do you have any suggestions on how to improve it? (Richard Friend, Shakopee, MN)

A. Do you have a cable TV outlet? Try attaching this to your external antenna connector on the stereo receiver. Is there a window facing the direction of the desired stations? Radio Shack has several models of AM/FM and FM-only amplified antennas which can be set on the sill.

Is it possible for you to run a small coaxial cable up to the attic crawl space? You can put a full-size FM antenna up there, or even a smaller antenna like the Radio Shack telescoping dipole (15-1827).

Questions or tips sent to "Ask Bob," c/o MT are printed in this column as space permits. If you desire a prompt, personal reply, mail your questions along with a self-addressed stamped envelope (no telephone calls, please) in care of MT, or e-mail to bgrove@grove.net. (Please include your name and address.) The current "Ask Bob" is now online at our WWW site: www.grove.net

Q. How well do those new radios-in-a-PC work? I know that my portable radio goes to hell when I bring it near my computer. Are the new plug-ins shielded well enough? (Bruce Tennant, Long Beach, CA)

A. Generally speaking, the computer plug-in receivers like the immensely popular WiNRADiO perform extraordinarily well in a computer environment. The key is, as you point out, shielding. Theoretically, if the entire plug-in radio is 100% shielded, and the antenna is connected from some distance away by well-shielded coaxial cable, there shouldn't be a problem.

In actual practice, we have found that there are some frequencies which may exhibit some interference; the severity depends upon the type of computer and the location of the remote antenna. Judging from the lack of returns of the WiNRADiO from customers, the shielding is very good.

YOU CAN BLOCK THOSE TV ADS

In the Aug issue of *MT* there was an "Ask Bob" question about commercial blockers. Paul Blumstein wrote us with some additional insight:

"My RCA VCR (Model VR678HF) has a Commercial Advance™ feature that 'discovers' commercials after it finishes recording, marks those commercials, and fast forwards through them at playback time. This was invented by Jerry Iggulden and licensed to and trademarked by Arthur D. Little, Inc.

"The manual states: 'Because television signals do not indicate where commercials are located, this feature finds and marks them through a set of formulas based on how television is broadcasted today. Since television stations broadcast differently and insert their own commercials, you may experience some variations in this feature's effectiveness. Station promotions, identifications, and announcements are not considered commercials.'

"My experience has been that it finds about 85% of the commercials. Once in a long while, it will start fast forwarding through a portion of the show, causing me to rewind. It is infrequent enough that I have never turned this feature off."

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14. Issue Date to Circulation Data Below: September 1997

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5. Free Distribution Outside the Mail (Carriers or other means)	375
6. Total Free Distribution (Sum of 4 and 5)	1,037
7. Total Distribution (Sum of 3 and 6)	27,297
8. Copies not Distributed	0
9. Total (Sum of 7 and 8)	27,297
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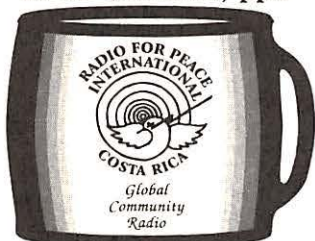
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By Bob Grove,
Publisher

Shortwave Listening is Perking Up Again!

With all the rough spots that have afflicted scanner hobbyists over the past few months, it is refreshing to report good news on the listening front. We are hearing more and more reports of favorable, long distance reception on the shortwave bands and lower.

Several reasons account for the renewed listening treasures to be heard on the high frequency (HF) spectrum and below. Without a doubt, the sunspot minimum is over; higher solar flux results in enhancement of the electrically-charged upper atmosphere—the ionosphere—resulting in radio waves being reflected back to Earth over great distances.

But there are other factors, too. Summer storms have run their course in the northern hemisphere; the din of static from lightning discharges is waning, allowing quieter reception of the tropical bands and lower frequencies during the winter season.

There seems to be a spate of interest in radio's absolute basement, VLF. The sounds of nature's own signals—"sferics" (short for "atmospherics") are being reported regularly. Inexpensive receivers and converters are picking up whistlers, swishers, the dawn chorus, chirps, clicks, and all manner of mysterious and enchanting radiation from our earth and its atmosphere.

The termination of the Omega navigational beacons in the 12-15 kHz region has opened up the first few kilohertz of the spectrum to a new age of reduced-interference monitoring. So what is the allure of listening to noises, you ask? Because it's there! I defy you to give a better rationale for logging nondirectional beacons, or reporting WWV time signal broadcasts month after month!

If you'd like to know more about this aspect of radio listening, I recommend you pick up a copy of the Nov/

Dec issue of *MT's* sister publication, *Satellite Times*. It contains two in-depth articles on the subject of natural radio, one by Stephen McGreevy (one of today's foremost experimenters in natural radio) and one by Larry Van Horn, editor of *Satellite Times*.

■ Radio Forecast: Looking Good

We are entering one of the most productive DX (distance) periods in a decade. Over the next few years we will experience greater and greater skip conditions for global monitoring. Hams have reason to rejoice as well, netting elusive, distant countries on the higher frequencies. And right now, low frequency enthusiasts can enjoy low frequency (LF) reception without the static crashes associated with summer storms.

Clearly, this is not the time to put those shortwave and general coverage radios away: start listening. And for those of you who wonder if this might be a good time to consider upgrading, it is. Take a look at the Grove Buyer's Guide and the advertisements throughout this issue of *MT*. You will be pleased at the offerings. During the past few years, we have witnessed an incredible increase in high performance reception at low cost, both in analog and digital technology.

Receivers are better, easier to use, and even antennas have been improved for those listeners with restricted real estate.

I predict that beginning now, radio hobbyists will have an unprecedented opportunity to experience a global panorama of utilities, broadcasts, ham radio, CB, and every other radio interest in the longwave and shortwave frequency bands, and at affordable prices.

Now isn't that nicer to read? Even better, it's true.

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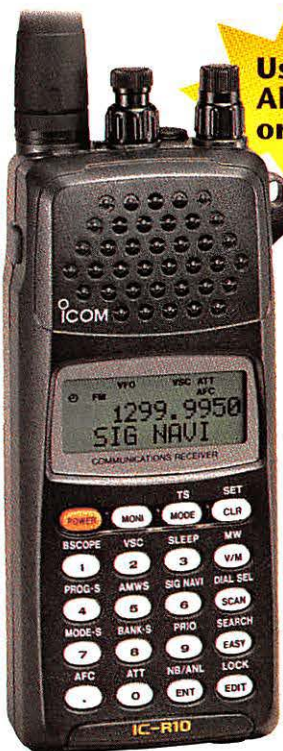
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- Built-in speaker for instant frequency demodulation and headphone jack for earphone audio
- Interface with the Scout for Reaction Tune
- TA100S Telescoping whip antenna included
- Built-in NiCad batteries (4 hour discharge) and power supply included

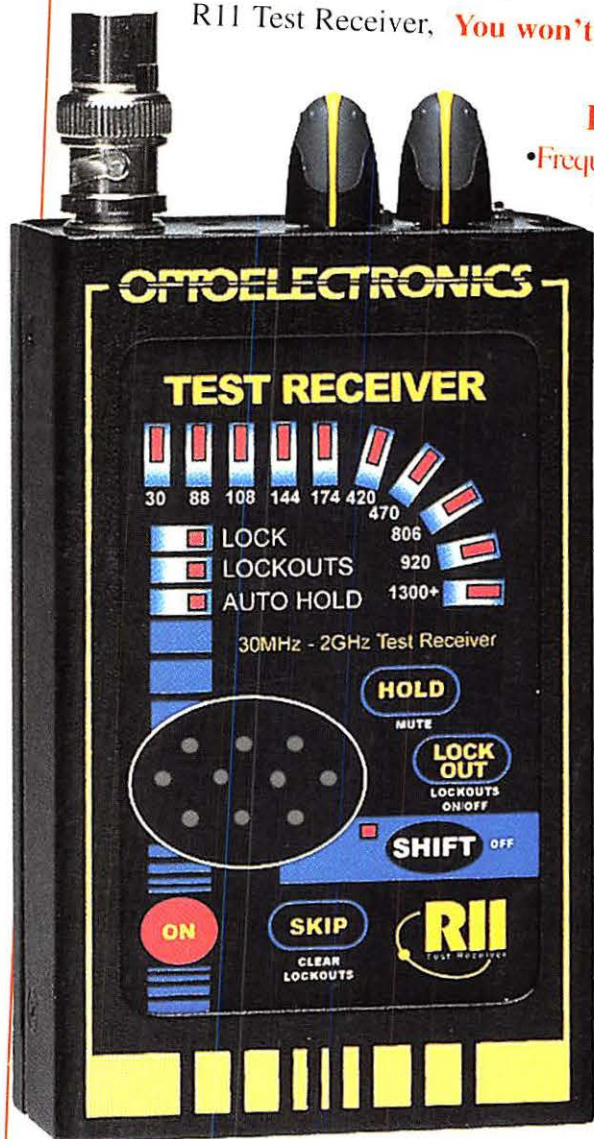


Reaction Tune with Scout using optional CB-RT (\$9)

Introductory Price
\$399.

OPTOELECTRONICS
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